232

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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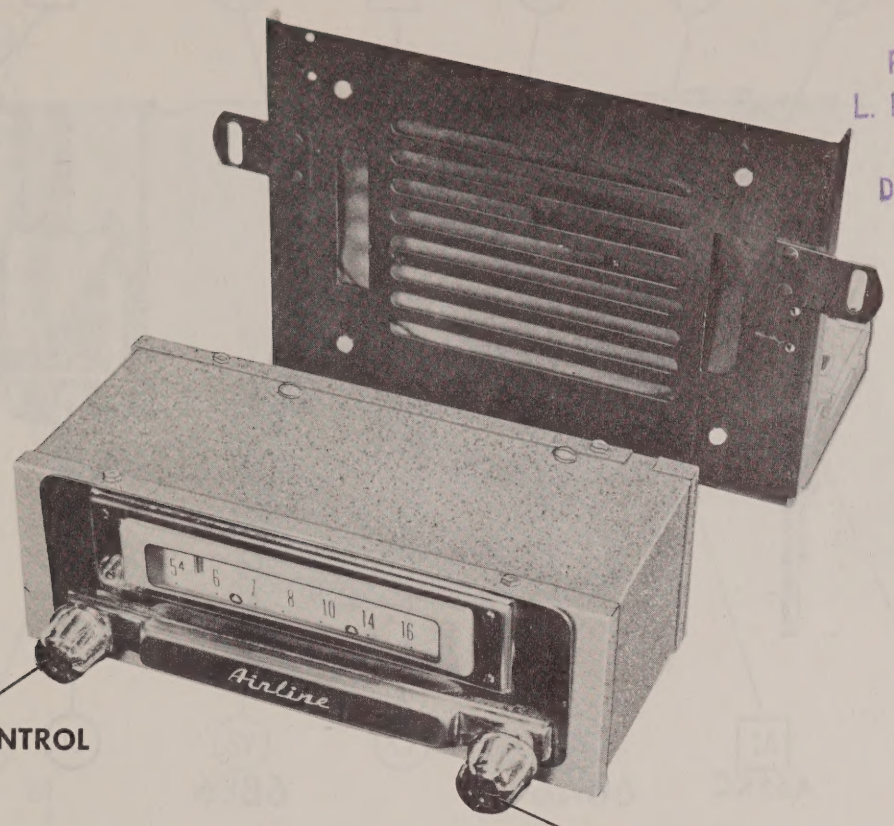

AIRLINE
MODEL 61-6794

TRADE NAME	Airline Model 61-6794
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Battery Operated AM Superheterodyne Receiver
TUBES	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AT6 or 6AV6 Det.-AVC-AF Amp., 6V6GT Audio Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.9 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400%Mod)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.	68MMF	High side to antenna receptacle. Low side to chassis.	1610KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6, A7	"
4.	With radio installed in car and antenna fully extended tune to a weak station near 1400KC and adjust A7 for maximum volume.						
	Tune to low frequency end stop and set pointer to last low frequency index mark on the dial.						

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4A	Det.-AVC-AF Amp.	6AT6	6AT6	7BT	
B	Det.-AVC-AF Amp.	6AV6	6AV6	7BT	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	350	CE-86	AFH3-109		CO80		FP345.8	TVL-3678	
B	▲20	350								
C	20	25								
C2	.05	200	C-503-2	P288-05	DF-503	PTE4S5		PT415	2TM-S5	
C3	100		CC-101	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C4	.006	400	C-602-4	P688-005	D6-502	PTE6D5	GP2-333-602	PT626	6TM-D6	
C5	.05	200	C-503-2	P288-05	DF-503	PTE4S5	GP1K-050	PT415	2TM-S5	
C6	5		CC-50	SI5				ZT-555	5GA-V5	
C7	40		CC-400	SI40	D6-400					
C8A	220									
B	5000									
C	250 *		*PC-151	*PA-113-2	*PC151		*1408-02		*103C5	
D	5000									
E	250*									
C9	.01	600	C-103-6	P688-01	DD-1032	PTE6S1	GP2-333-103	PT611	6TM-S1	
C10	.005	200	C-502-2	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C11	.47	100	C-504-1	VHC-36		MP2P5		RF480	2TM-P5	
C12	.008	1600	C-802-16	VBC-26		PTE1608		PT1628	MB-D8	
C13	.47	100	C-504-1	UHC-36		MP2P5		RF480	2TM-P5	

* Items C8A, C8B, C8C, C8D, C8E, R9A, R9B, R9C are combined in one unit.
When replacing items separately items C8C and C8E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	750KΩ	½	RV-57	Q13-137	AG-79-Z	B-70-S	U-51	Volume-See Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

Note: Some Models may use an alternate control (part #RV-132)

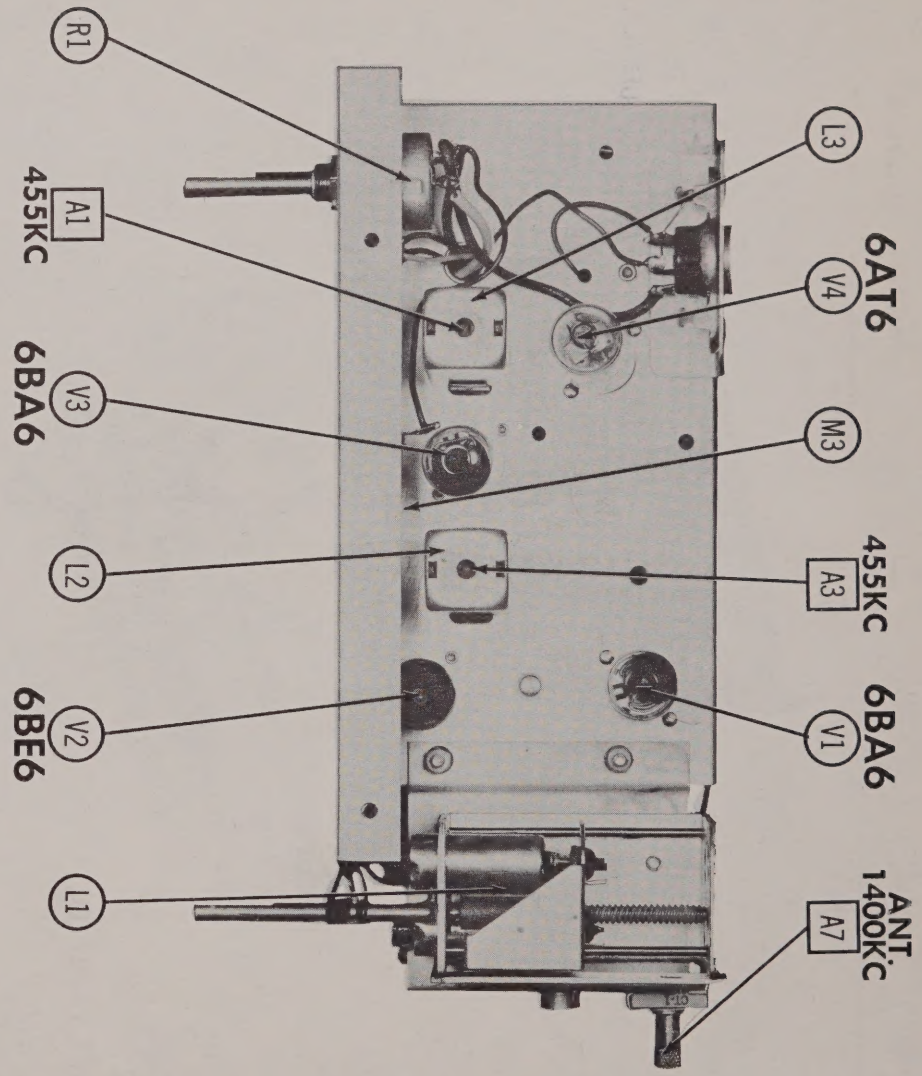
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R2	470KΩ	½	R474	BTS-470K	
R3	150Ω	½	R151	BTS-150	Note 1
R4	150KΩ	½	R154	BTS-150K	
R5	47KΩ	½	R473	BTS-47K	
R6	1500Ω	½	R152	BTS-1500	Note 2
R7	6800Ω	2	R682-2	BTB-6800	
R8	2.2Meg	½	R225	BTS-2.2Meg	Note 3

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R9A	6.8Meg	½	*PC-151	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R10	470KΩ	½	R474	BTS-470K	
R11	330Ω	½	R331	BTS-330	
R12	1000Ω	1	R102-1	BTA-1000	
R13	100Ω	½	R101	BTS-100	
R14	100Ω	½	R101	BTS-100	

Note 1. Some Models may use a 220Ω resistor in this application.
Note 2. Some Models may use a 1000Ω resistor in this application.
Note 3. Some Models may use a 2Meg resistor in this application.
* Items R9A, R9B, R9C, C8A, C8B, C8C, C8D, C8E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T1	6.3VAC @2A	430VCT .046ADC			TV-100		P-2971	V3801)	V-16K

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	5KΩ	3.2Ω	370Ω	.54Ω	Part of Spkr.	A-3877	A-2930	Z1001	S-3X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6 x 9"	PM	3.2Ω	PM-900	ST-810 Mod. P69-V	69A3	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1A	Ant. Coil	13Ω						Part of tuner assy. (tuner part #PT-500)
B	RF Coil	13Ω						Part of tuner assy. (tuner part #PT-500)
C	Osc. Coil	.5Ω	2.6Ω					Part of tuner assy. (tuner part #PT-500)
L2	Input IF	18Ω	18Ω	1655-16	16-6758	BC-352	12-C1	
L3	Output IF	18Ω	18Ω	1655-16	16-6758	BC-353	12-C2	
L4	Fil. Choke	0Ω		L203			5221	1.5 Microhenries
L5	Vibrator Hash Choke	0Ω		L202			5221	4 Microhenries

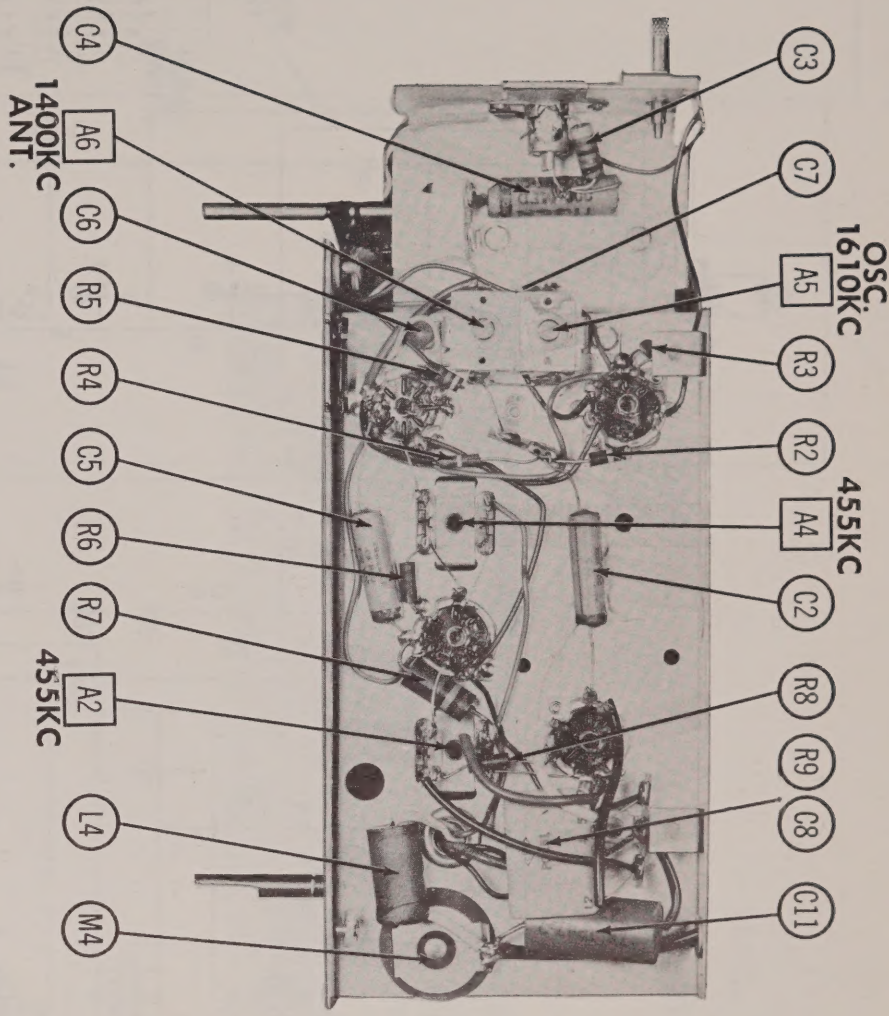
VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				AIRLINE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115v	V-83	5301	859	5301	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AIRLINE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	14A	A200	FH226 (Includes lead assy.)	307014 (14A-SFE)	155014	SFE14	HD1

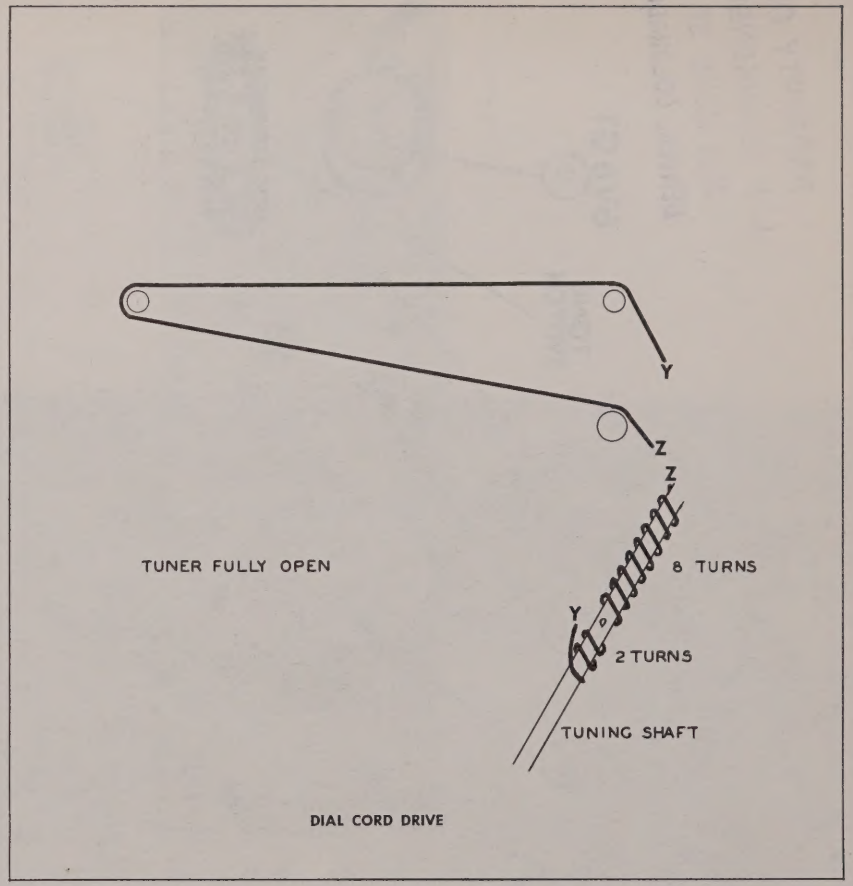
CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	AIR LINE PART No.	NOTES
M3	Dial Light	T47	Type #47
M4	Spark Plate		
M5	Switch	SS-1	Bass-Treble Slide Switch
A5	Trimmer Cap.	CT-3	Osc. Trimmer
A6	Trimmer Cap.	CT-2	RF Trimmer
A7	Trimmer Cap.	CT-1	Antenna Compensator
	"A" Lead Assy.	FH226	Includes fuse holder
	Knob	H310E	Off/On/Volume-Tuning (2 used)
	Dial Scale	DP150	



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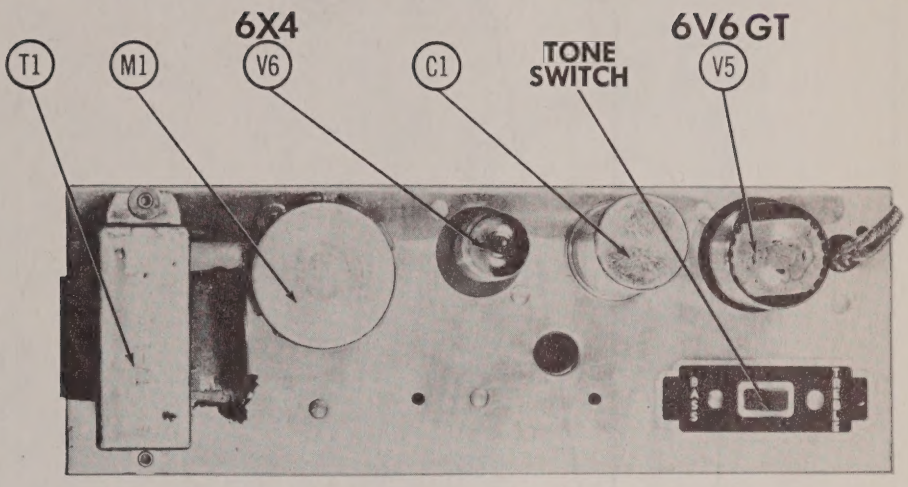

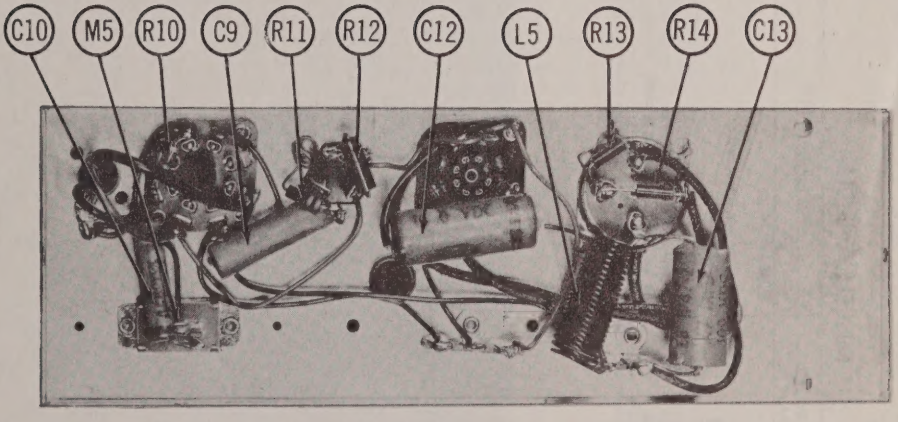

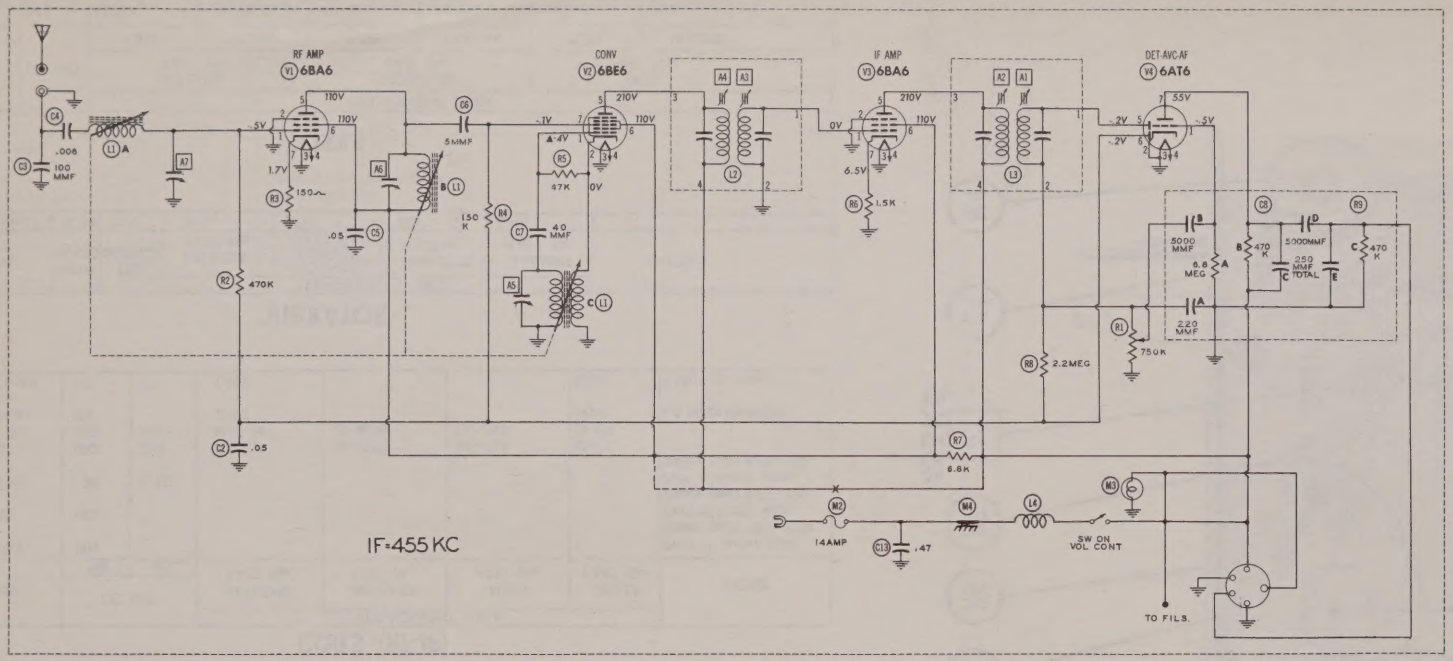

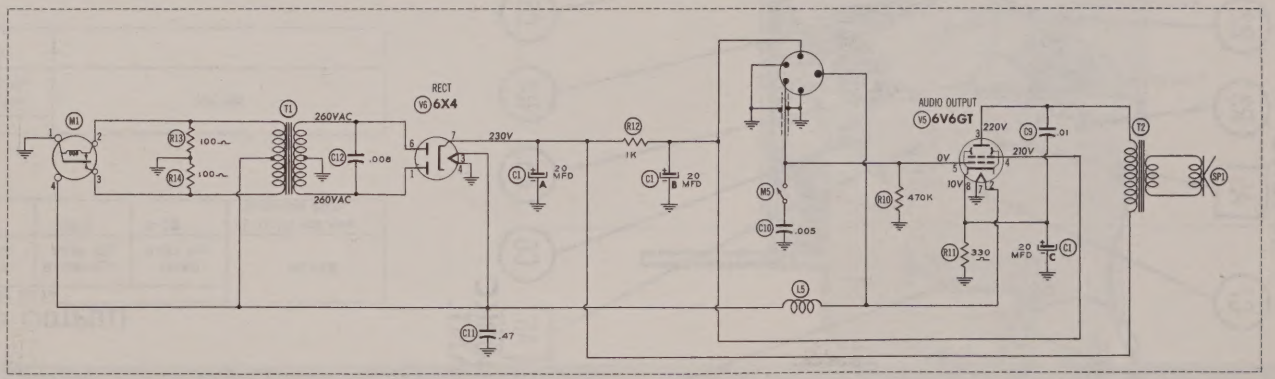

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	3.5Meg	0Ω	0Ω	.4Ω	*6.8KΩ	*6.8K	150Ω	
V 2	6BE6	47KΩ	.3Ω	0Ω	.4Ω	*1KΩ	*6.8KΩ	2.8Meg	
V 3	6BA6	17Ω	0Ω	0Ω	.4Ω	*1KΩ	*6.8KΩ	1.5KΩ	
V 4	6AT6	470KΩ	0Ω	0Ω	.4Ω	750KΩ	2.8Meg	*470KΩ	
V 5	6V6	INF	.4Ω	*370Ω	*1KΩ	470KΩ	INF	0Ω	330Ω
V 6	6X4	385Ω	INF	.4Ω	0Ω	INF	400Ω	3Meg	

*MEASURED FROM PIN 7 OF V6
▲TAKEN WITH VACUUM TUBE VOLTMETER

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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232-1

1 - DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

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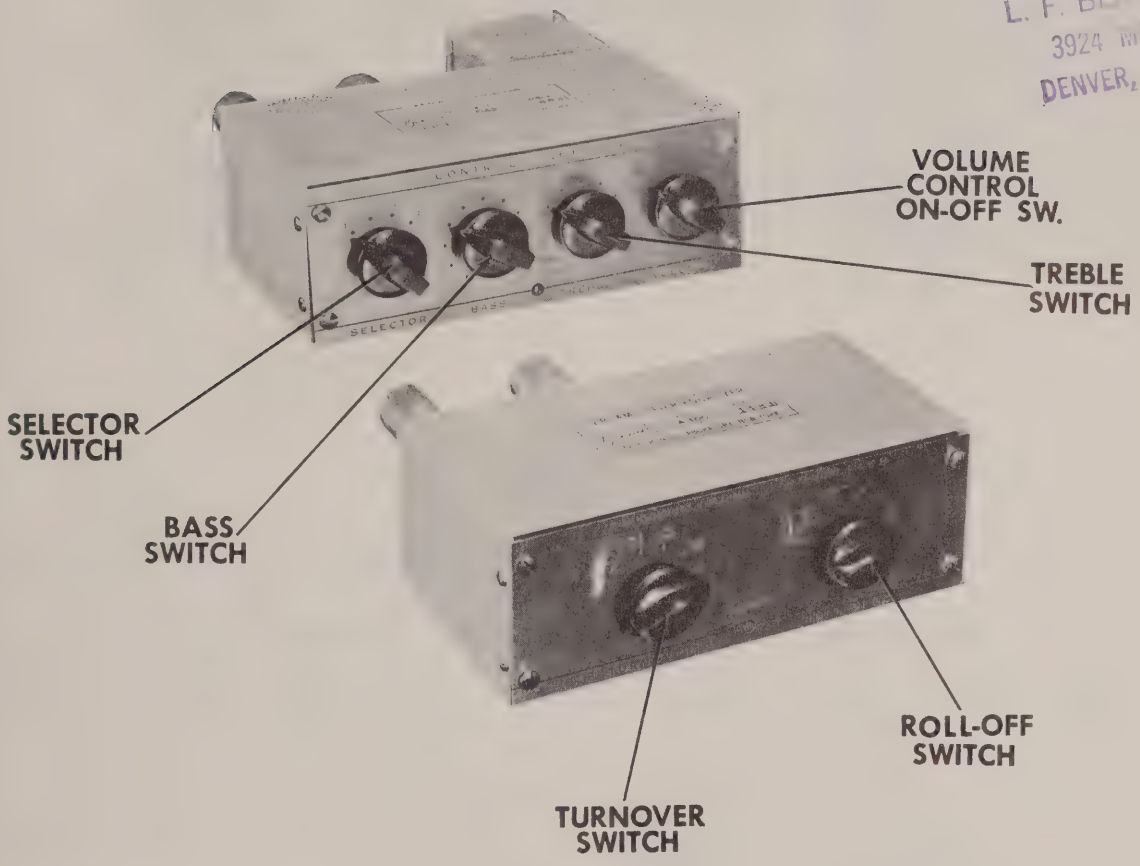
BROCINER
MODELS A100, CA-2



BROCINER
MODELS A100, CA-2

TRADE NAME	Brociner Models A100 (Equalizer), CA-2 (Pre-Amplifier)
MANUFACTURER	Brociner Electronics Laboratory, 344 E. 32nd. St., New York 16, N.Y.
TYPE SET	AC Operated Pre-Amplifier and Equalizer (Model A100) & Control Amplifier (Model CA-2)
TUBES	(Model A100) Types 12AY7 & 12AU7 (Model CA-2) Types (2) 12AX7
POWER SUPPLY	110-120 Volts AC RATING .14 Amp. @ 117 Volts AC (Models CA-2 only)

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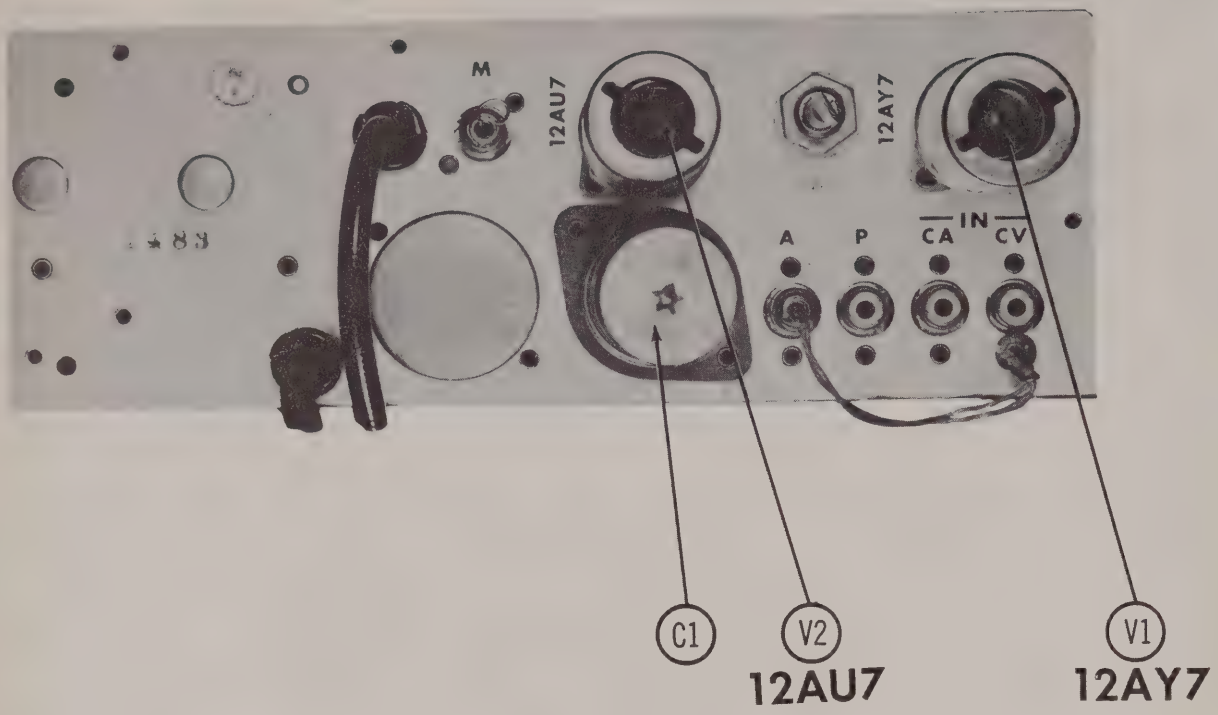
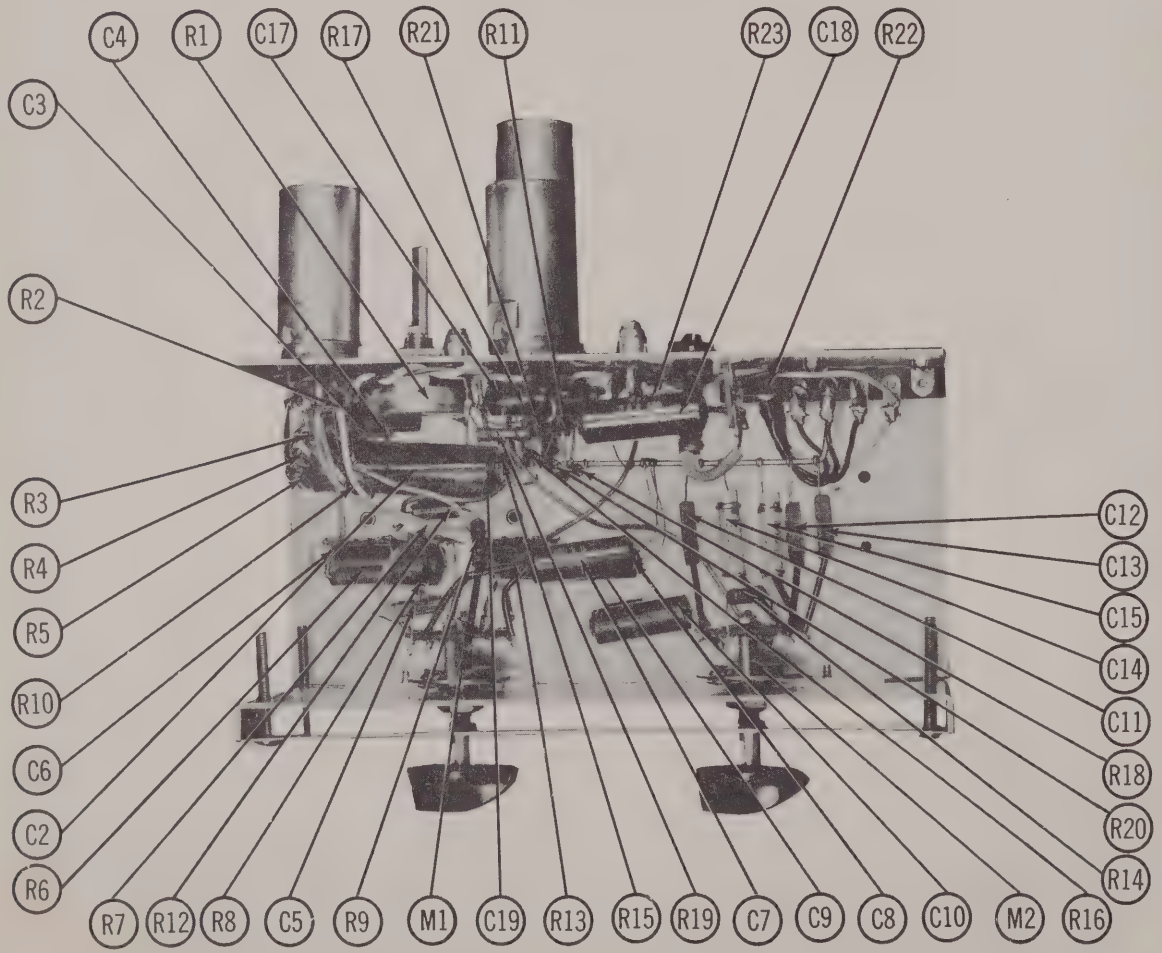


CHASSIS TOP VIEW–MODEL A100



CHASSIS BOTTOM VIEW–MODEL A100

PARTS LIST-MODEL A100

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		BROCINER PART No.	STANDARD REPLACEMENT		
V1	Pre-Amplifier	12AY7	12AY7	9A	
V2	AF Amplifier	12AU7	12AU7	9A	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	BROCINER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■25	350		AFH2-39		BO31		FP227.3	TVL-2626	
B	▲25	350		PRS25/50		BR502		TC29	TVA-1206	
C	50	10								
C2	50	10		PRS25/50		BR502		TC29	TVA-1206	
C3	150	500		1479-00015		5R5T15		MCB236		
C4	820	500								
C5	680	500								
C6	.1	400		P488-1		PTE4P1		PT401	4TM-P1	
C7	.05	400		P488-05		PTE4S5		PT415	4TM-S5	
C8	.03	200		P288-03		PTE6S3		PT613	2TM-S3	
C9	.03	200		P288-03		PTE6S3		PT613	2TM-S3	
C10	.05	400		P488-05		PTE4S5		PT415	4TM-S5	
C11	330	500								
C12	390	500								
C13	220	500								
C14	150			1479-00015		5R5T15		MCB236		
C15	150			1479-00015		5R5T15		MCB236		Note 1
C16	220	500								
C17	.05	400		P488-05		PTE4S5		PT415	4TM-S5	
C18	.1	400		P488-1		PTE4P1		PT401	4TM-P1	
C19	200	500								

Note 1. Not used in all Models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BROCINER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	250KΩ	½	URC023	Q11-130	AG-55-8	B-50	U-46	Gain control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROCINER PART No.	IRC PART No.	
R2	62KΩ	½		BTS-62K	
R3	51KΩ	½		BTS-51K	
R4	4.7Meg	½		BTS-4.7Meg	
R5	1000Ω	½		BTS-1000	
R6	100KΩ	½		BTS-100K	
R7	150KΩ	½		BTS-150K	
R8	3900Ω	½		BTS-3900	
R9	18KΩ	½		BTS-18K	
R10	470KΩ	½		BTS-470	
R11	1000Ω	½		BTS-1000	
R12	100KΩ	½		BTS-100K	
R13	100KΩ	⅓		BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BROCINER PART No.	IRC PART No.	
R14	100KΩ	½		BTS-100K	
R15	4700Ω	½		BTS-4700	
R16	100KΩ	½		BTS-100K	
R17	51KΩ	½		BTS-51K	
R18	680Ω	½		BTS-680	
R19	1Meg	½		BTS-1Meg	
R20	100KΩ	½		BTS-100K	
R21	4700Ω	½		BTS-4700	
R22	4700Ω	½		BTS-4700	
R23	4700Ω	½		BTS-4700	

MISCELLANEOUS

ITEM No.	PART NAME	BROCINER PART No.	NOTES
M1	Switch		Turnover (Rotary type)
M2	Switch		Roll-off (Rotary type)

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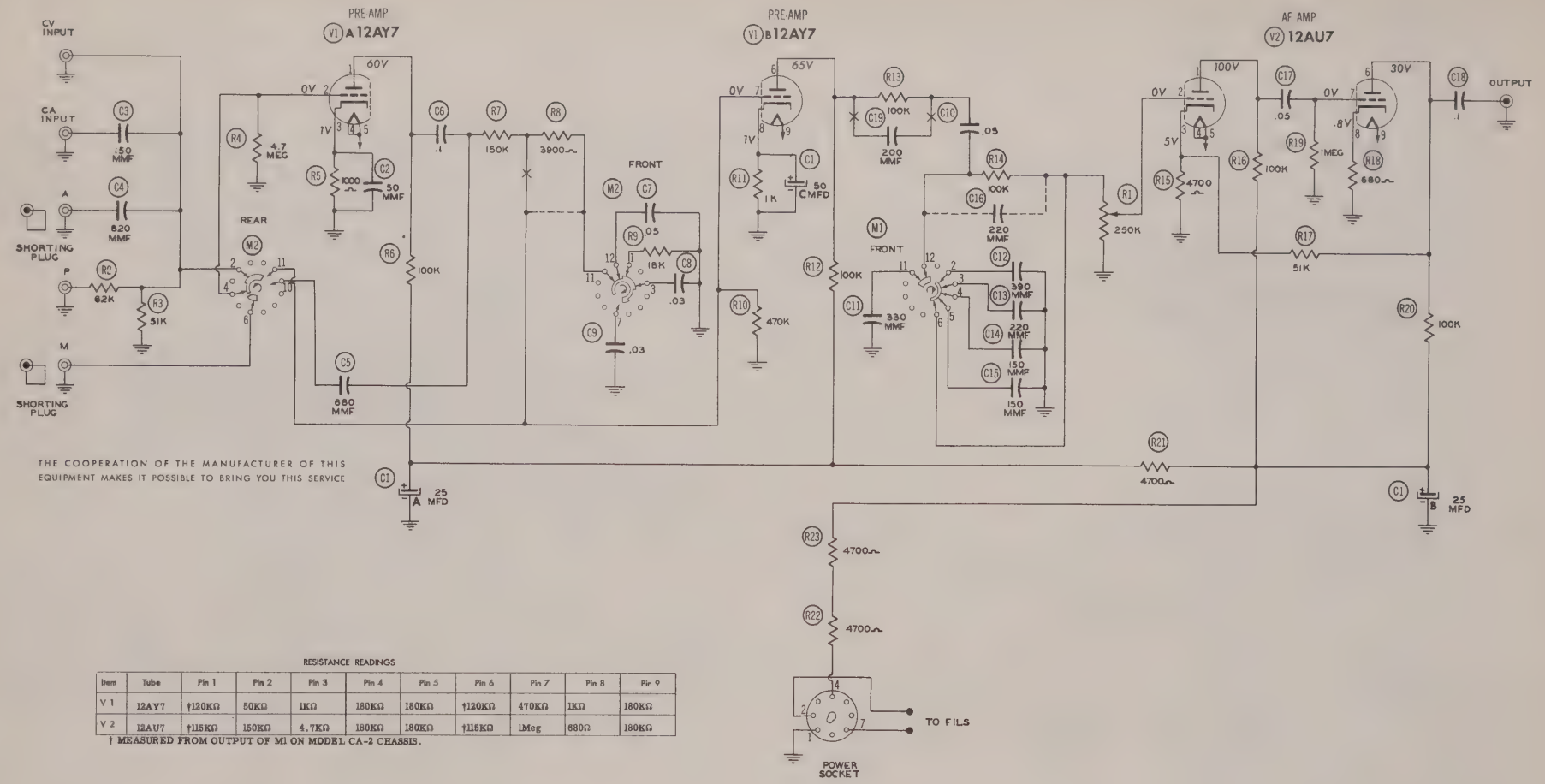

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AY7	†120KΩ	50KΩ	1KΩ	180KΩ	180KΩ	†120KΩ	470KΩ	1KΩ	180KΩ
V 2	12AU7	†115KΩ	150KΩ	4.7KΩ	180KΩ	180KΩ	†115KΩ	1Meg	680Ω	180KΩ

† MEASURED FROM OUTPUT OF M1 ON MODEL CA-2 CHASSIS.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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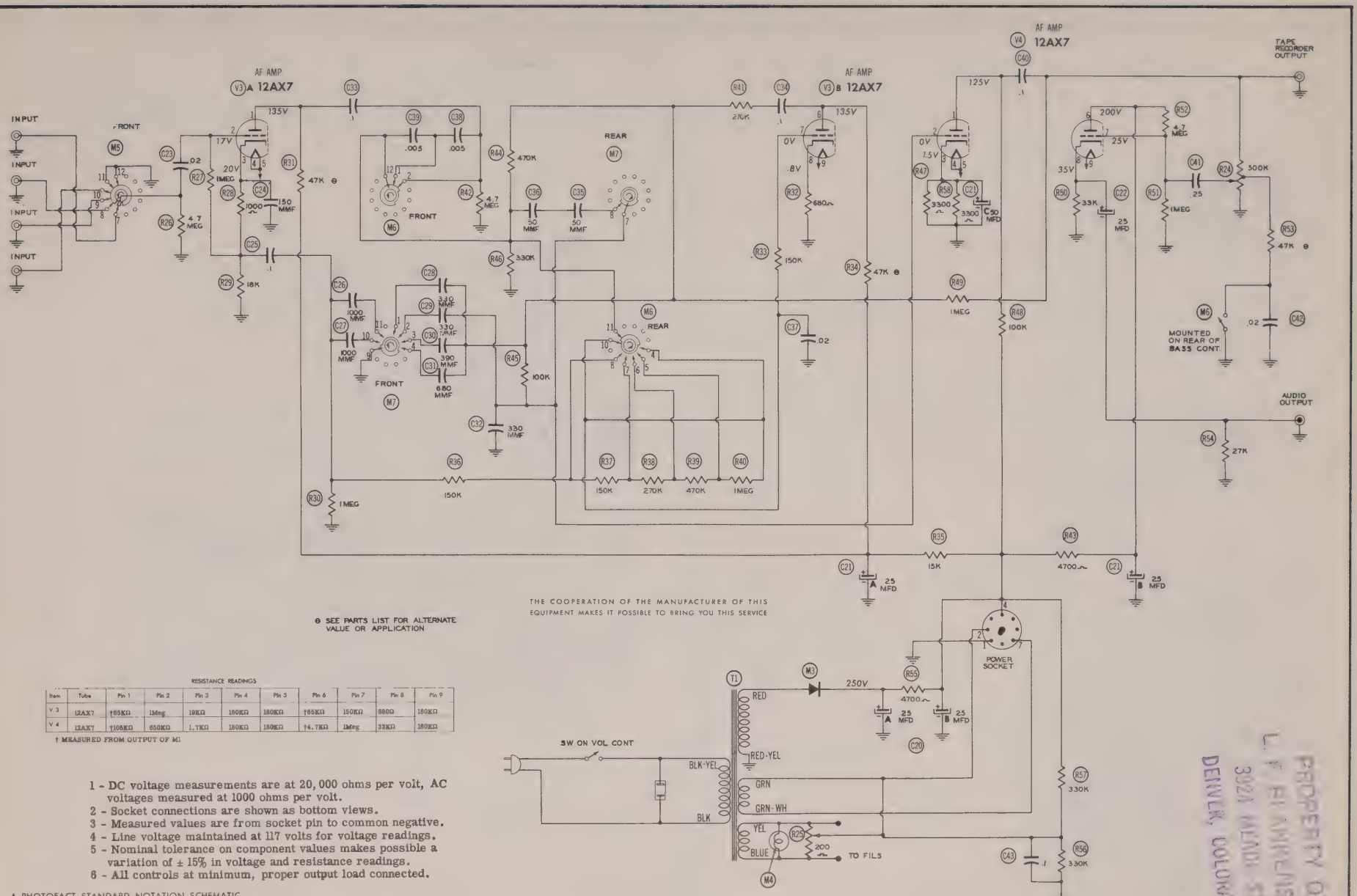
232-2

SCHEMATIC—MODEL A100



θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 3	12AX7	†65KΩ	1Meg	19KΩ	180KΩ	180KΩ	†65KΩ	150KΩ	680Ω	180KΩ
V 4	12AX7	†105KΩ	650KΩ	1.7KΩ	180KΩ	180KΩ	†4.7KΩ	1Meg	33KΩ	180KΩ

† MEASURED FROM OUTPUT OF M1

1 - DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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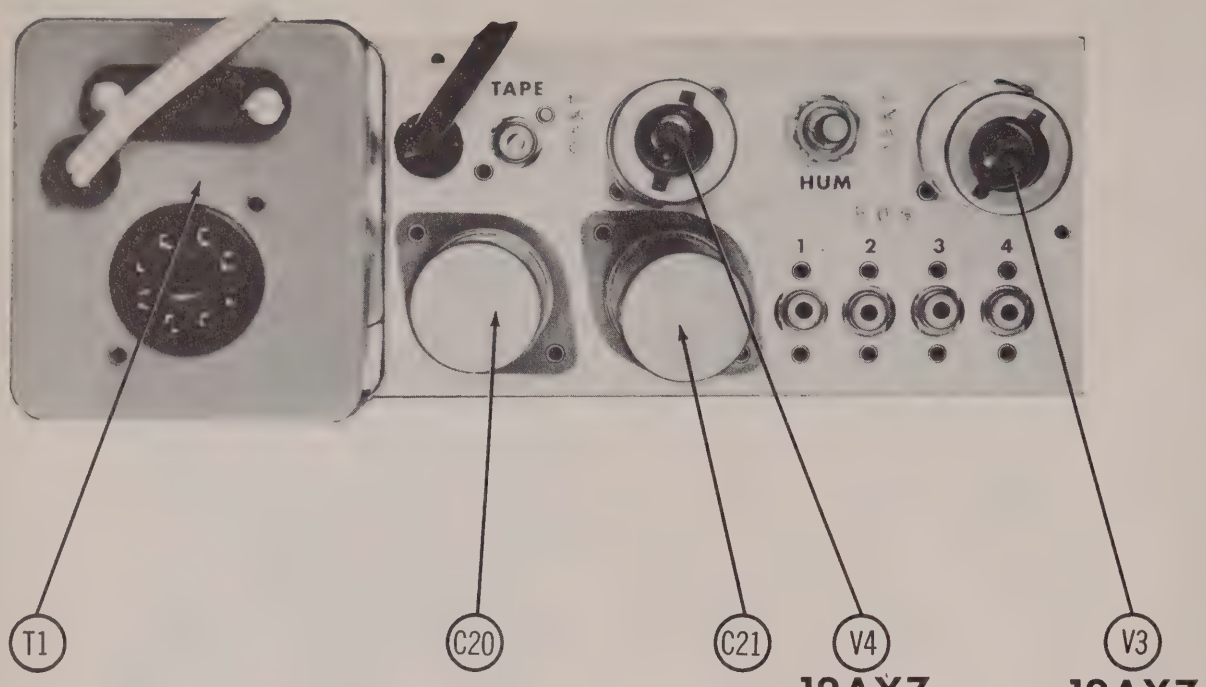
SCHEMATIC—MODEL CA-2

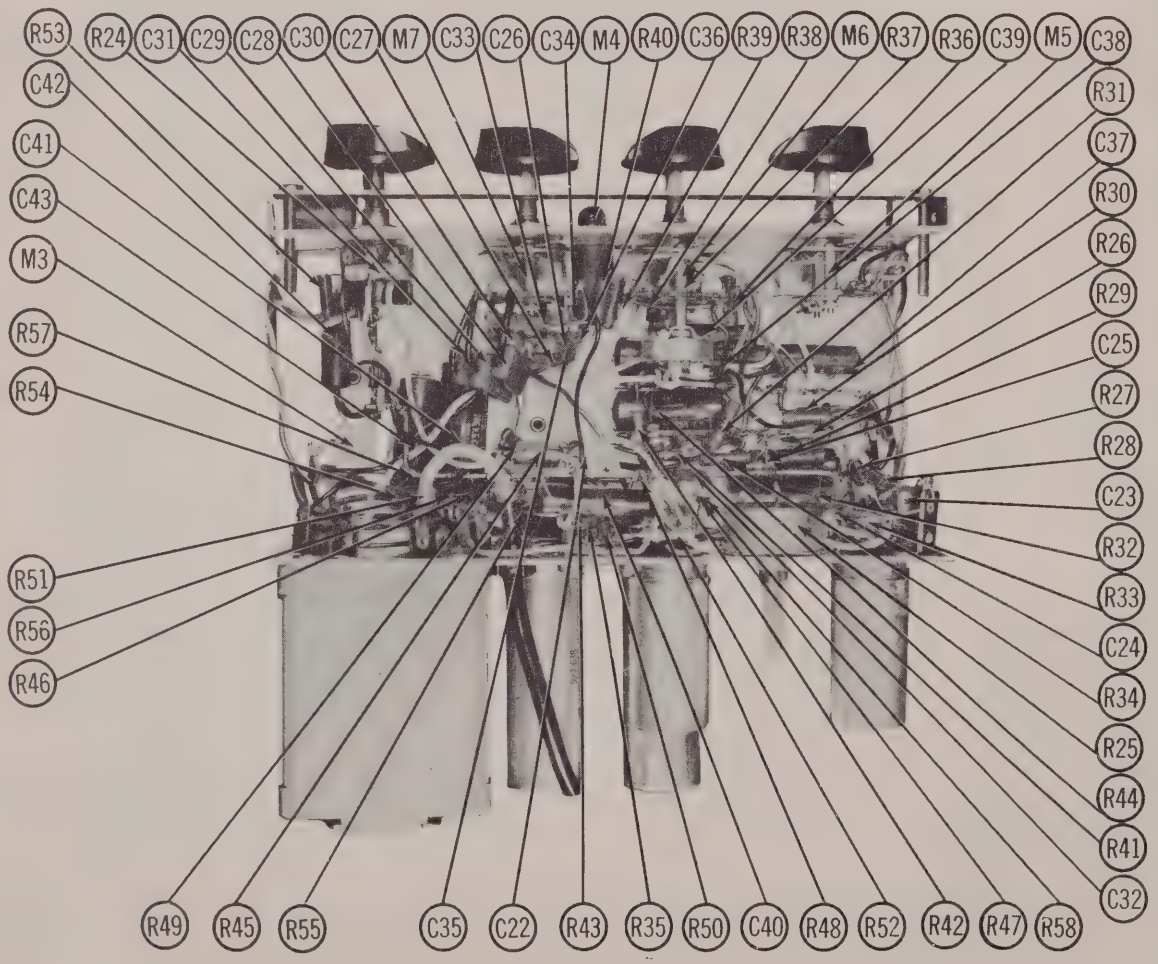
PROPERTY OF
L. F. ELMENDORF
3021 MEADE
DENVER, COLORADO

232-2

BROCINER
MODELS A100, CA-2



CHASSIS TOP VIEW—MODEL CA-2



CHASSIS BOTTOM VIEW—MODEL- CA-2

PARTS LIST-MODEL CA-2

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: BROCINER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V3	AF Amplifier	12AX7	12AX7	9A	
V4	AF Amplifier	12AX7	12AX7	9A	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BROCINER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C20A	▲25	350		AFH2-39		BO31		FP227.3	TVL-2626	
B	■25	350								
C	50	10								
C21A	▲25	350		AFH2-39		BO31		FP227.3	TVL-2626	
B	■25	350		PRS25/50		BR502		TC29	TVA-1206	
C	50	10								
C22	25	50		PRS50/25		BR255		TC36	TVA-1306	
C23	.02	200		P288-02		PJ2S2		PT4S2	2TM-S2	
C24	150	500		1479-00015		5R5T15		MCB236		
C25	.1	400		P488-1		PTE4P1		PT401	4TM-P1	
C26	1000	500		1464-001		2R5D1		MCB255	1FM-21	
C27	1000	500		1464-001		2R5D1		MCB255	1FM-21	
C28	330	500								
C29	330	500								
C30	390	500								
C31	680	500								
C32	330	500								
C33	.1	600		P688-1		PTE6P1		PT601	6TM-P1	
C34	.1	600		P688-1		PTE6P1		PT601	6TM-P1	
C35	50	500		1469-00005		5R5Q5		MCB225	1FM-45	
C36	50	500		1469-00005		5R5Q5		MCB225	1FM-45	
C37	.02	200		P288-02		PJ2S2		PT412	2TM-S2	
C38	.005	400		P488-005		PTE4D5		PT425	4TM-D5	
C39	.005	400		P488-005		PTE4D5		PT425	4TM-D5	
C40	.1	400		P488-1		PTE4P1		PT401	4TM-P1	
C41	.25	200		P288-25		PJ2P25		PT4025	2TM-P25	
C42	.02	200		P288-02		PJ2S2		PT412	2TM-S2	
C43	.1	200		P288-1		PJ2P1		PT401	2TM-P1	

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: BROCINER PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R26	4.7Meg	1/2		BTS-4.7Meg	
R27	1Meg	1/2		BTS-1Meg	
R28	1000Ω	1/2		BTS-1000	
R29	18KΩ	1/2		BTS-18K	
R30	1Meg	1/2		BTS-1Meg	
R31	47KΩ	1/2		BTS-47K	Note 1
R32	680Ω	1/2		BTS-680	
R33	150KΩ	1/2		BTS-150K	
R34	47KΩ	1/2		BTS-47K	Note 1
R35	15KΩ	1/2		BTS-15K	
R36	150KΩ	1/2		BTS-150K	
R37	150KΩ	1/2		BTS-150K	
R38	270KΩ	1/2		BTS-270K	
R39	470KΩ	1/2		BTS-470K	
R40	1Meg	1/2		BTS-1Meg	
R41	270KΩ	1/2		BTS-270K	
R42	4.7Meg	1/2		BTS-4.7Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: BROCINER PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R43	4700Ω	1/2		BTS-4700	
R44	470KΩ	1/2		BTS-470K	
R45	100KΩ	1/2		BTS-100K	
R46	330KΩ	1/2		BTS-330K	
R47	3300Ω	1/2		BTS-3300	
R48	100KΩ	1/2		BTS-100K	
R49	1Meg	1/2		BTS-1Meg	
R50	33KΩ	1/2		BTS-33K	
R51	1Meg	1/2		BTS-1Meg	
R52	4.7Meg	1/2		BTS-4.7Meg	
R53	47KΩ	1/2		BTS-47K	Note 1
R54	27KΩ	1/2		BTS-27K	
R55	4700Ω	1/2		BTS-4700	
R56	330KΩ	1/2		BTS-330K	
R57	330KΩ	1/2		BTS-330K	
R58	3300Ω	1/2		BTS-3300	

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: BROCINER PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T1	117VAC	240VAC	5.8V	5.5V					
	ⓐ.14A	.011ADC	ⓐ.78A	ⓐ.55A					

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: BROCINER PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M3	.011A		8Y1 ①		8S35 ①	35 ①	① Three units used in series

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BROCINER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R24A	500KΩ	1/2	6182580	Q13-133X		BT-66-S	UT-430	Volume - tapped ⓐ 125KΩ
B	Switch		Not Req.	76-1		Not Req.	US-26	Attach to R1A
R25A	200Ω	2	ES680193-2	W-200	A43-200			Hum control
B	Shaft		Not Req.	Not Req.	RS-2			Attach to R25A

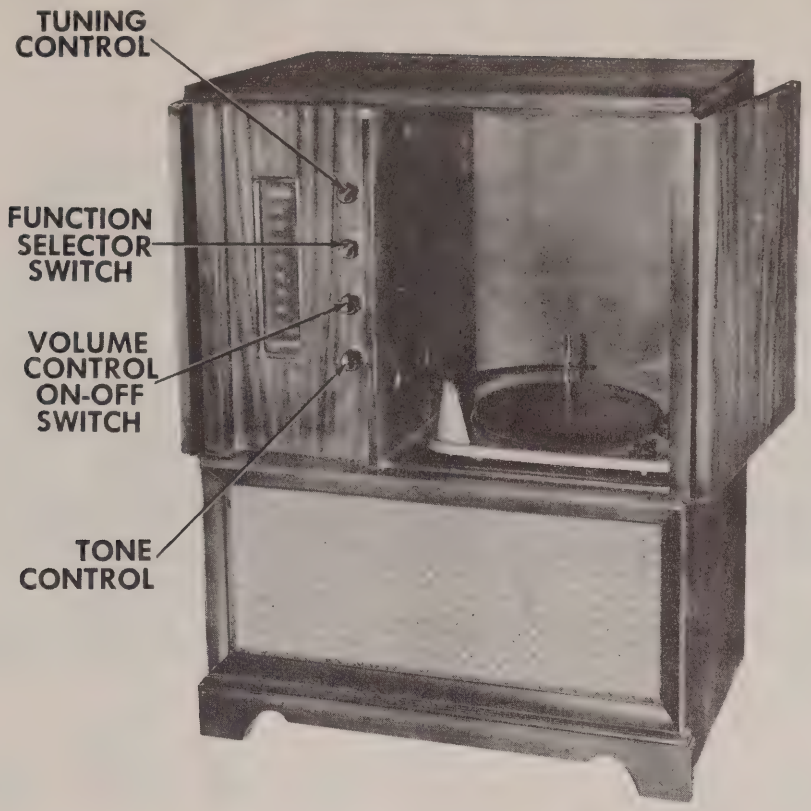
MISCELLANEOUS

ITEM No.	PART NAME	BROCINER PART No.	NOTES
M4	Dial Light		#47 Bayonet
M5	Switch		Input Selector
M6	Switch		Bass
M7	Switch		Treble

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PROPERTY OF
L. F. FRANKENSHIN
3324 MILNE ST.
DENVER, COLORADO

CORONADO
MODEL 45RA1-43-7666A



CORONADO
MODEL 45RA1-43-7666A

TRADE NAME	Coronado Model 45RA1-43-7666A
MANUFACTURER	Gamble-Skogmo Inc., 15 N. 8th.St., Minneapolis, Minn.
TYPE SET	AC Operated Radio - Phono Combination Superheteroydne Recever
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AVC-AF Amp., 6AQ5 Audio Output, 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .28 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	High side to pin 1 (grid) of 6BA6 (V1). Low side to chassis.	1620KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6	Adjust for maximum deflection while rocking tuning gang through 1400KC. signal. If necessary, reset pointer to 1400KC on the dial scale.
5.	50MMF	High side to external antenna terminal.	1400KC	Tune to 1400KC signal	"	A7	Adjust for maximum deflection.

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT V-28A171, SEE SIMILAR V-M MODEL 950- PHOTOFACT SET 107 - FOLDER 13 OR RECORD CHANGER MANUAL CM-3.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

CORONADO
MODEL 45RA1-43-7666A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CORONADO PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BA6	6BA6	7BK	
V4	Det.-AVC-AF Amp	6AV6	6AV6	7BT	
V5	Audio Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■40	200	45X381	AFH2-29		BO24		FP221	TVL-3520	
B	▲40	150		PRS50/20		BR202		TC26	TVA-1205	
C	20	25								
C2	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	.02	200	RCP10W2203M	P288-02	DF-203	PJ2S2		PT412	2TM-S2	
C5	500		47X508	SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C6	33		47X612		TCN-33			UC-5433	5TCU-Q33	
C7	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C8	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9A	50		*76X1	*PA-99	*PC-52	TM5Q5	*1403-03	UC-545	*100C3	
B	50					TM5Q5		UC-545		
C10	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C11	68	500	47X471							
C12	.02	200	RCP10W2203M	P288-02	DF-203	PJ2S2		PT412	2TM-S2	
C13	.005	400	RCP10W4502M	P488-005	D6-502	PTE4D5	GP2-333-502	PT425	4TM-D5	
C14A	10000									
B	250		♦76X5	♦PA-112-3	♦PC-80		♦1404-01		♦102C1	
C										
C15	.001	600	RCP10W6102M	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C16	.1	200	RCP10W2104M	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C17	.01	200	RCP10W2103M	P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	

* Items C9A, C9B and R12 combined in one unit.
♦ Items C14A, C14B, C14C, R16A and R16B are combined in one unit.
C14B and C14C total 250MMF when replacing by separate units.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	36X372B	Q13-133X	AT-78	BTSK-66-S	UT-430	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWA	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	40X310	Q13-133	AG-60-Z	BSK-60	U-48	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R2A

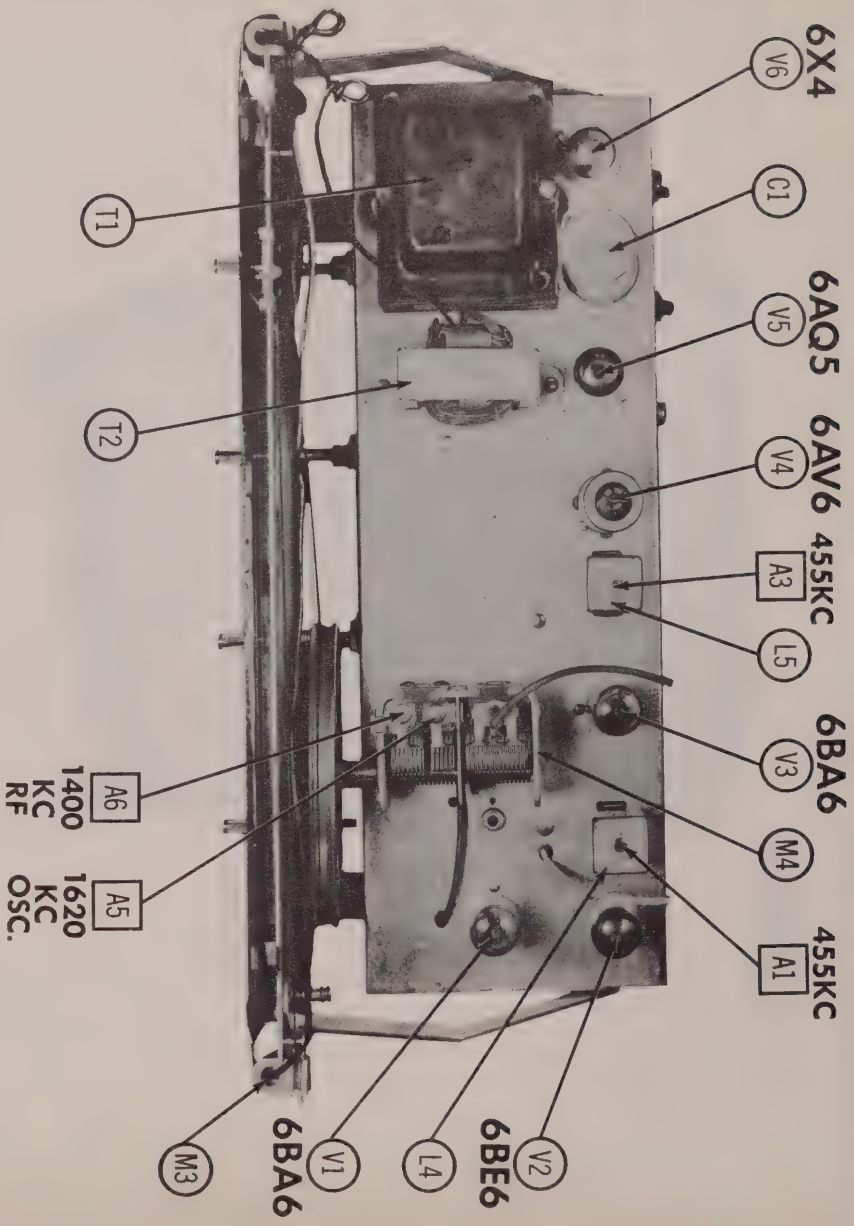
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R3	100Ω	½	B84101	BTS-100	
R4	100KΩ	½	B84104	BTS-100	
R5	56KΩ	½	B84563	BTS-56K	
R6	10KΩ	½	B84103	BTS-10K	
R7	47Ω	½	B85470	BTS-47	
R8	22KΩ	½	B85223	BTS-22K	
R9	1000Ω	½	B84102	BTS-1000	
R10	2.2Meg	½	B85225	BTS-2.2Meg	
R11	330Ω	½	B84331	BTS-330	
R12	47KΩ	½	*76X1	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R13	270KΩ	½	B84274	BTS-470K	
R14	15KΩ	½	B84153	BTS-15K	
R15	10Meg	½	B85106	BTS-10Meg	
R16A	500KΩ	½	♦76X5		
B	500KΩ	½			
R17	47KΩ	½	B85473	BTS-47K	
R18	270Ω	½	B84271	BTS-270	
R19	820Ω	2	D84821	BTB-820	
R20	1800Ω	1	C85182	BTS-1800	

* Items R12, C9A, C9B are combined in one unit.
♦ Items R16A, R16B, C14A, C14B, C14C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	CORONADO PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T1	117VAC @.28A	314VCT .051A	6.3VAC @2.9A		53X291G				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		CORONADO PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	5.8KΩ	3.4Ω	426Ω	.83Ω	51X134E	A-3877①	A-3019	Z1002	S-5Z	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	8"	PM	3.4Ω	12A477	ST-115 Mod. P8-V	8A21	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	.1Ω	1.2Ω	9A2296				Tapped @ 6Ω
L2	RF Coil	9Ω		9A2289				
L3	Osc. Coil	.5Ω	7Ω	9A2113	14-1060		71-Osc.	
L4	Input IF	11Ω	12Ω	9A2112	16-6758	BC-352	12-C1	
L5	Output IF	12Ω	14Ω	9A2063	16-6758	BC-353	12-C2	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	CORONADO PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	P-81E	AC-AG-J	A-AG	W26B	A66U	33	0-2 or S-2	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

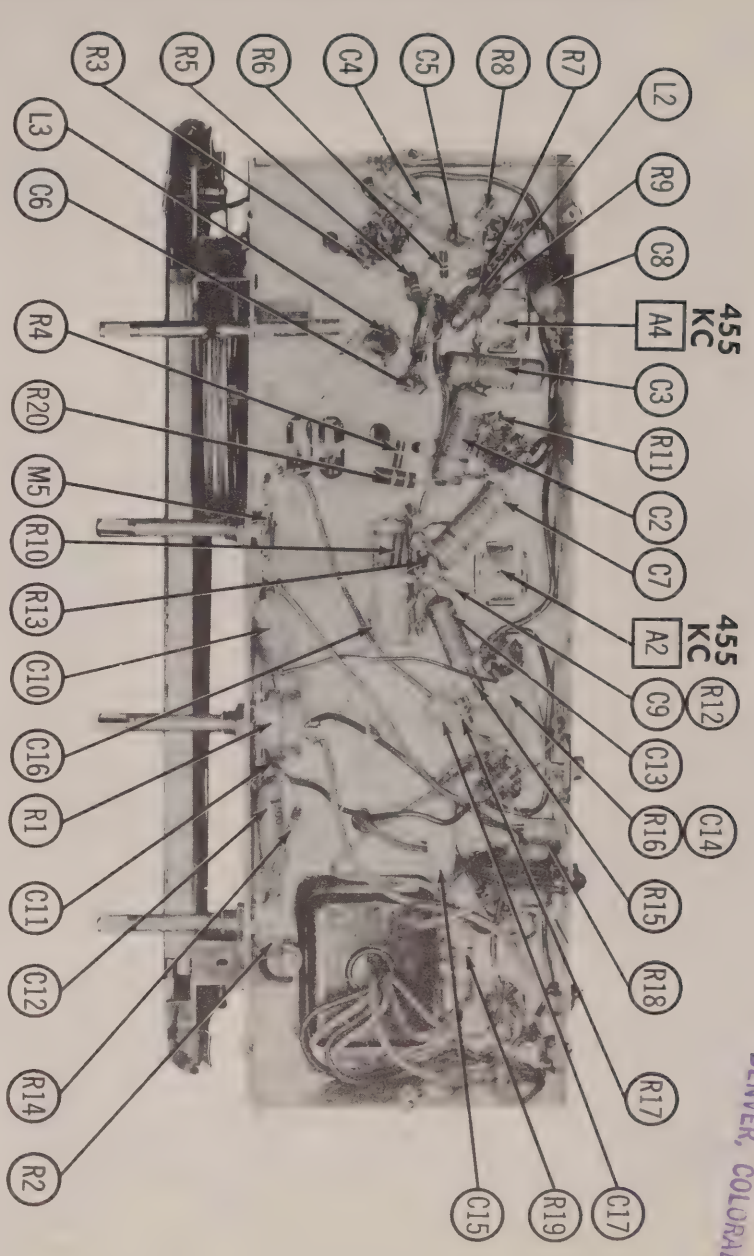
ITEM No.	REPLACEMENT DATA			REMARKS
	C ORONADO PART No.	WALCO PART No.	JENSEN PART No.	
M2	85-38	W-30AGA or W-30AGS	JP-312 or JPS-312	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M3	Dial Light	7A103	(2) #47 Bayonet
M4	Tuning Cap.	14A213	3 Gang (24- 472MMF) (14-240MMF)(13-115MMF)
M5	Switch	2A405	Radio-phono selector (rotary)
A7	Trimmer Cap.	17A235	2-24MMF across loop antenna
	Knob	10A759	4 used
	Dial Glass	58X772	

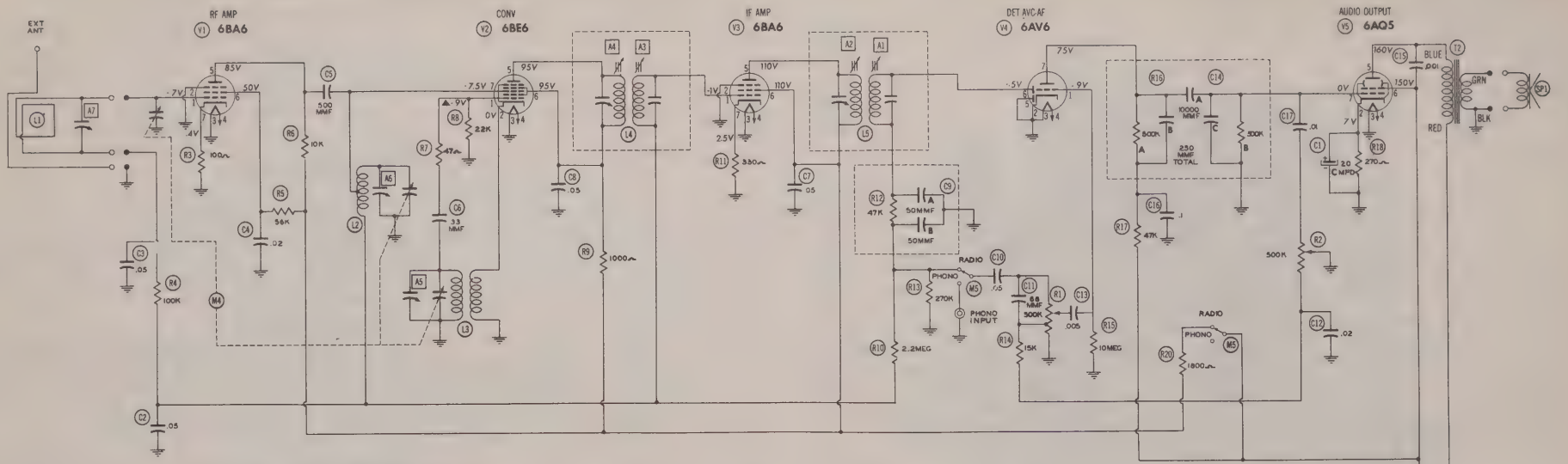
SET 232 FOLDER 3

CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

CORONADO
MODEL 45RAI-43-7666A



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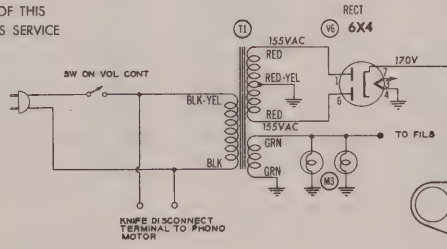
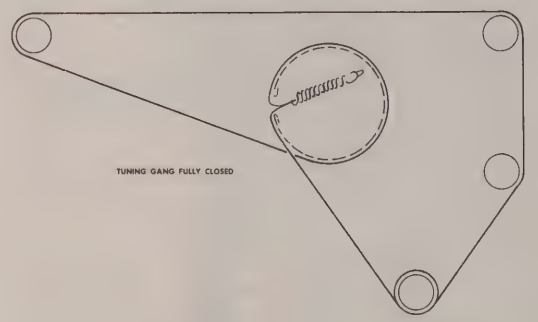
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE





RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	2.6Meg	0Ω	0Ω	.1Ω	†12.6KΩ	†60KΩ	100Ω
V 2	6BE6	22KΩ	.5Ω	0Ω	.1Ω	†3.6KΩ	†3.6KΩ	2.5Meg
V 3	6BA6	2.5Meg	0Ω	0Ω	.1Ω	†2.6KΩ	†2.6KΩ	330Ω
V 4	6AV6	10Meg	0Ω	0Ω	.1Ω	0Ω	320KΩ	†550KΩ
V 5	6AQ5	500KΩ	270Ω	0Ω	.1Ω	†425Ω	†820Ω	500KΩ
V 6	6X4	145Ω	INF	.1Ω	0Ω	INF	150Ω	100KΩ

† MEASURED FROM PIN 7 OF V6

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1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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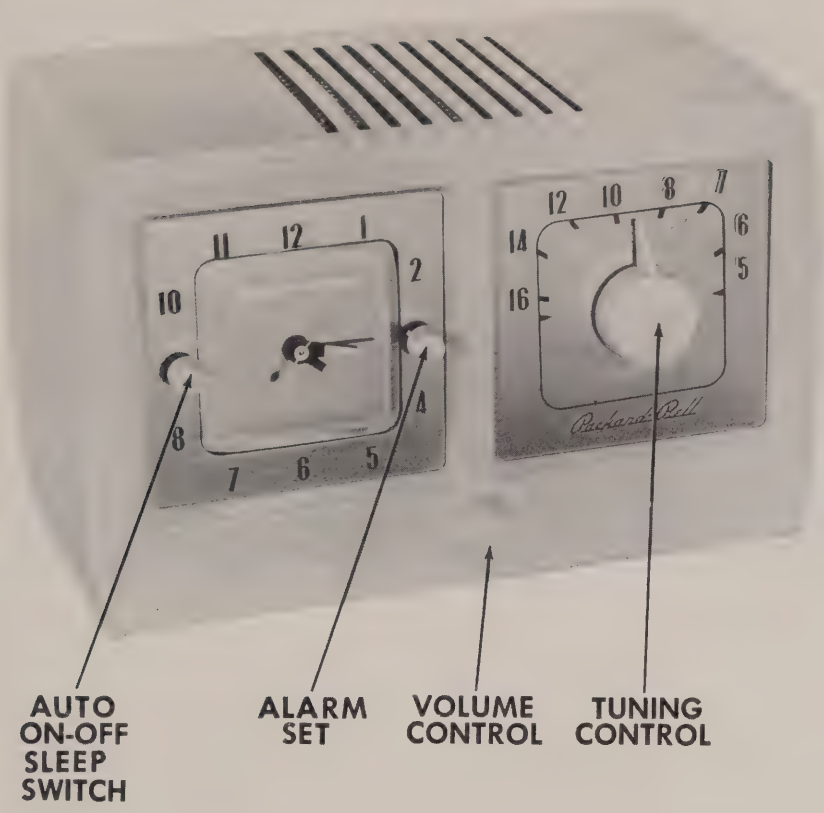

PACKARD-BELL
MODEL 532

TRADE NAME	Packard-Bell Model 532
MANUFACTURER	Packard-Bell Co., Service Div., 11th. & Hope Sts., Los Angeles 15, Calif.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to antenna clip. Low side to B-.	1620KC	"	"	A5	"
3.	"	"	1500KC	Tune to 1500KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

PACKARD-BELL MODEL 532

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Packard-Bell PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	24073	PRS150/50-50		BBRD5515		2N521	TVA-2453	Red
B	50	150								Yellow
C2	.05	200	23017	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	220		23915	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C4	220		23915	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C5	5000		23931	BPD-005	DD-502	TM5D5	812-005	DC-525	5HK-D5	
C6	470		23916	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C7	10000		23939	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C8	10000		23939	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C9	.05	200	23017	289ZX-05		PJ2S5		PT415	2TM-S5	
C10	.2	200		P288-2		PJ2P2		PT402	2TM-P2	Note 1

Note 1. Some Models use .15MFD @ 200V in this application.

CONTROLS

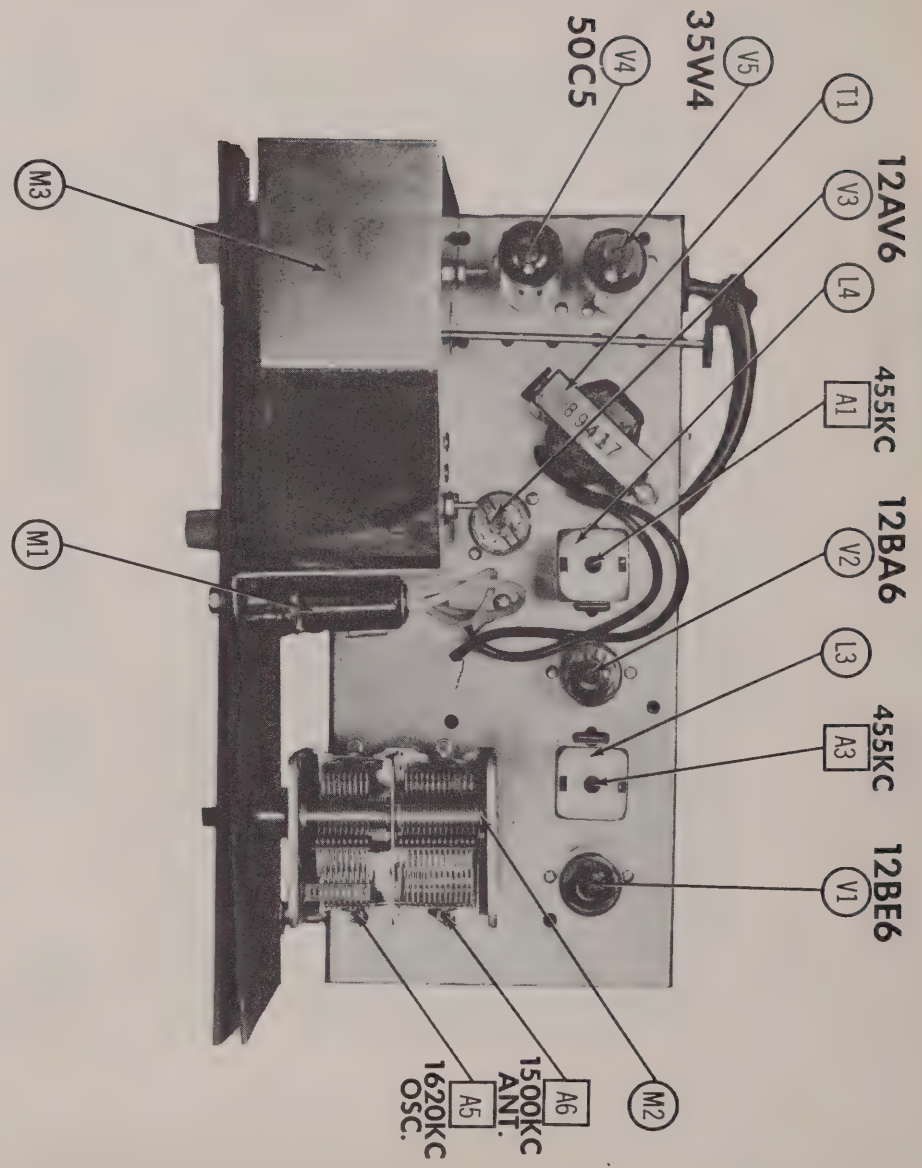
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Packard-Bell PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	PB-25028	Q13-133	AG-60-Z	BSK-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Packard-Bell PART No.	IRC PART No.	
R2	22KΩ	½	73041	BTS-22K	
R3	220Ω	½	73017	BTS-220	
R4	2.2Meg	½	73165	BTS-2.2Meg	
R5	4.7Meg	½	73169	BTS-4.7Meg	
R6	470KΩ	½	73157	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Packard-Bell PART No.	IRC PART No.	
R7	470KΩ	½	73157	BTS-470K	
R8	150Ω	1½	73015	BTS-150	
R9	1000Ω	1	73225	BTA-1000	
R10	68Ω	½	73011	BTS-68	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		Packard-Bell PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2.3KΩ	3.3Ω	135Ω	.7Ω	89417	A-3332	A-3025	Z1101	S-2X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Packard-Bell PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	83008B	ST-113 Mod. P4-X	4A1	

COILS (RF-IF)

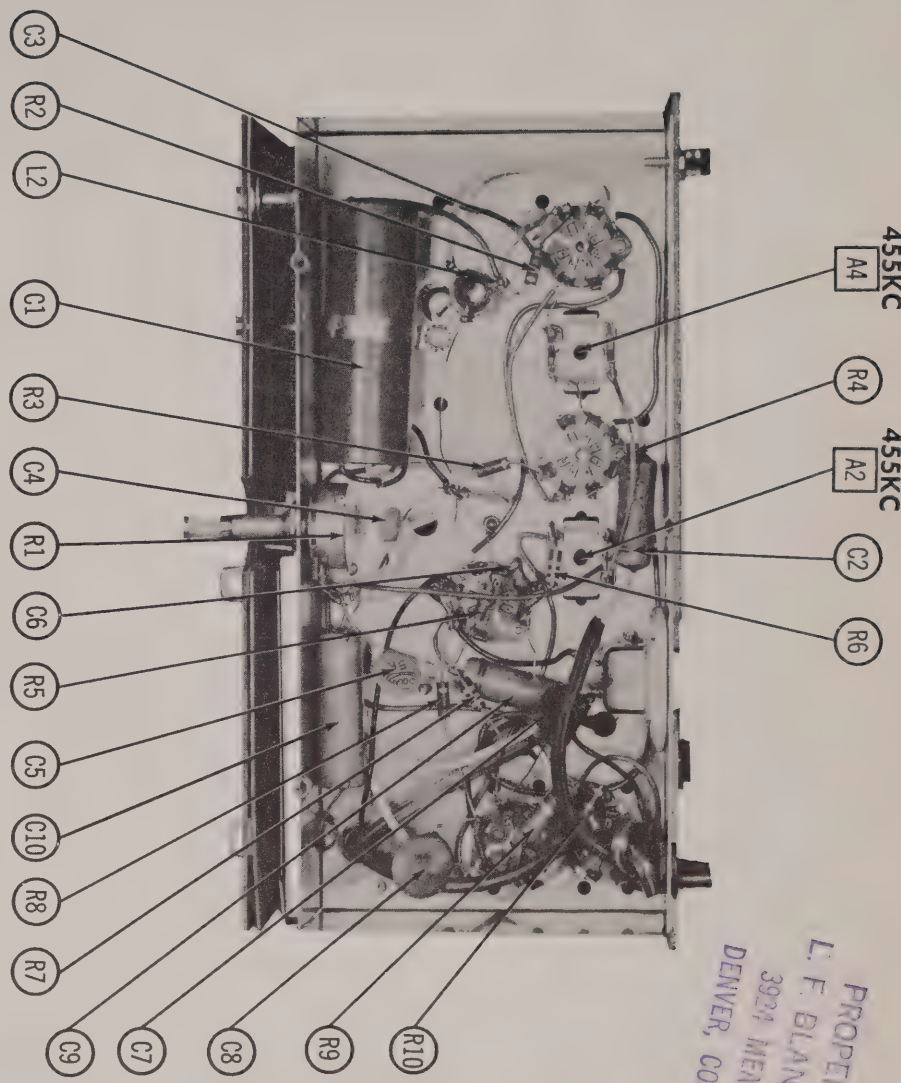
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Packard-Bell PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	0Ω	1.6Ω	29331				Note 1
L2	Osc. Coil	1.2Ω	7.5Ω	29220	14-1074		70-Osc.	
L3	Input IF	20Ω	20Ω	29066	16-6758	BC-352	12-C1	
L4	Output IF	15Ω	15Ω	29067	16-6758	BC-353	12-C2	

Note 1. Some models may use loop ant. coil form in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M1	Dial light	54002	# 47 bayonet
M2	Tuning cap	23528	2 section (37-488MMF, 20-192MMF)
M3	Clock	58044	Complete
	Cabinet	532	Specify color
	Knob	52080AL	Volume-for ivory, pink, or blue cabinet
	Knob	52079AL	Tuning-for ivory, pink, or blue babinet
	Knob	58038-1AL	(2) clock-for ivory, pink, or blue cabinet
	Knob	52080-2AB	Volume-for brown cabinet
	Knob	52079AB	Tuning-for brown cabinet
	Knob	58038-1AB	(2) clock-for brown cabinet
	Dial	38135	

CHASSIS—BOTTOM VIEW



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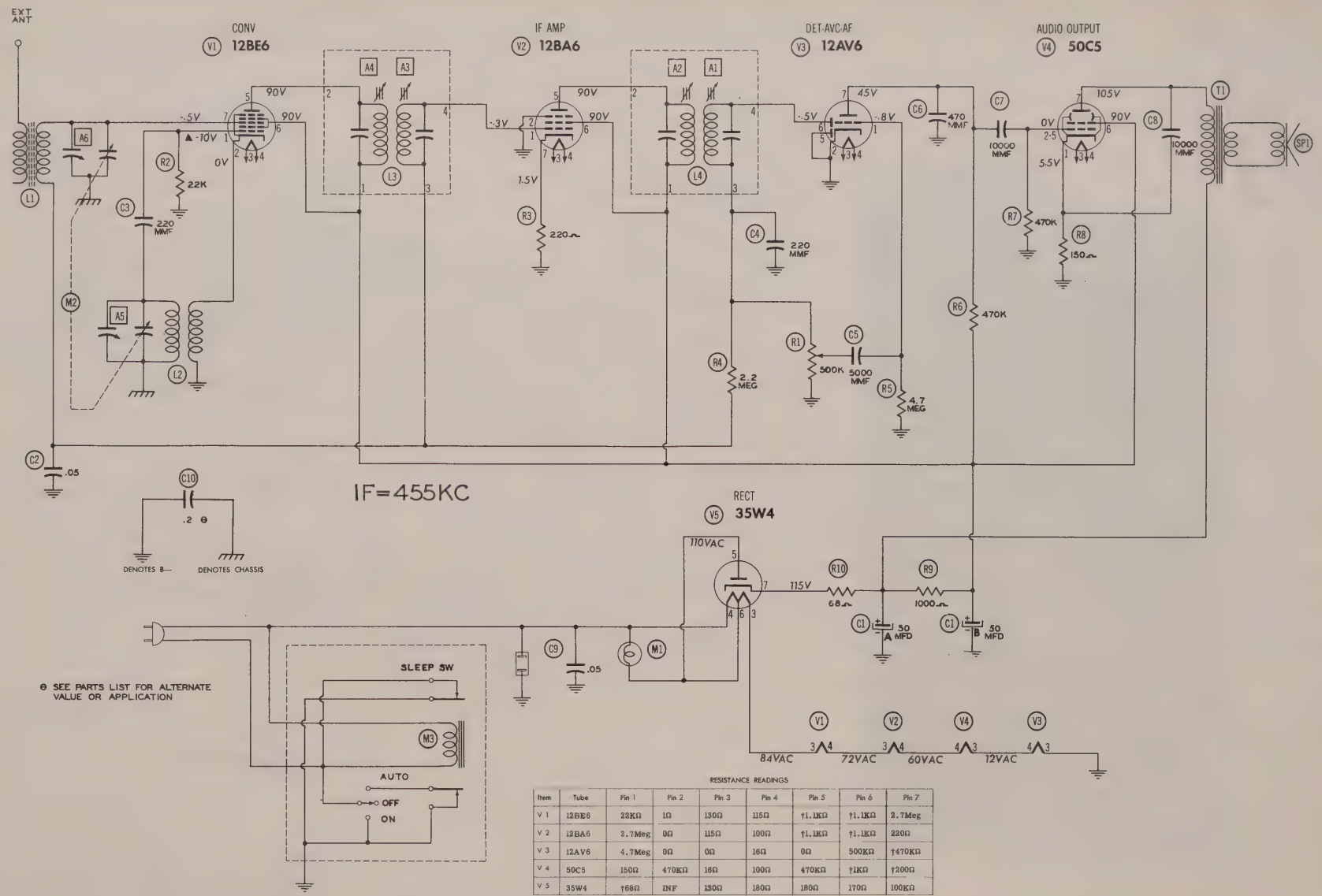

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	130Ω	115Ω	†1.1KΩ	†1.1KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	115Ω	100Ω	†1.1KΩ	†1.1KΩ	220Ω
V 3	12AV6	4.7Meg	0Ω	0Ω	16Ω	0Ω	500KΩ	†470KΩ
V 4	50C5	150Ω	470KΩ	16Ω	100Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	†68Ω	INF	130Ω	180Ω	180Ω	170Ω	100KΩ

† MEASURED FROM PIN 7 OF V5

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232-4

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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MODEL 21-T-363

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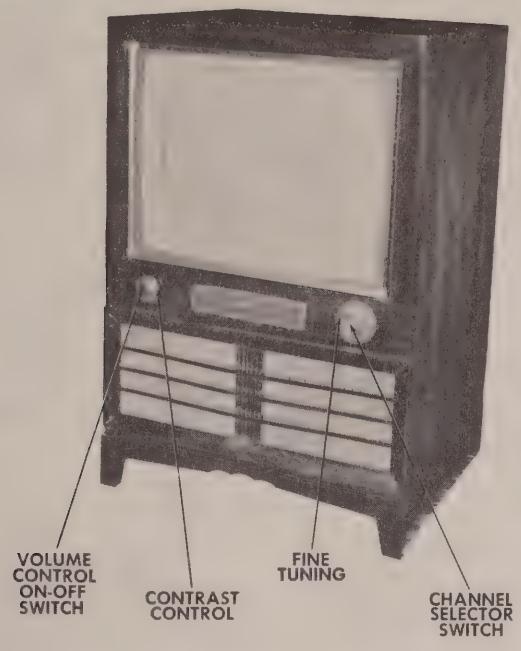

RCA VICTOR MODEL 21-T-363

TRADE NAME	RCA Victor	MODELS	CHASSIS	TUNERS
		21-T-356U	KCS83E	KRK12A
		21-T-363	KCS83	KRK29
		21-T-363U	KCS83B	KRK12A
		21-T-364	KCS83	KRK29
		21-T-364U	KCS83B	KRK12A
		21-T-365	KCS83	KRK29
		21-T-365U	KCS83B	KRK12A
		21-T-372	KCS83	KRK29
		21-T-372U	KCS83B	KRK12A
		21-T-373	KCS83	KRK29
		21-T-373U	KCS83B	KRK12A
		21-T-374	KCS83	KRK29
		21-T-374U	KCS83B	KRK12A
		21-T-375	KCS83	KRK29
		21-T-375U	KCS83B	KRK12A
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N. J.			
TYPE SET	Television Receiver			
TUBES	Twenty-two			
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.88 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)			

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RCA VICTOR MODELS 21-T-356U, 21-T-363, U, 21-T-364, U, 21-T-365, U, 21-T-372, U, 21-T-373, U, 21-T-374, U, 21-T-375, U (Ch. KCS83, B, E)

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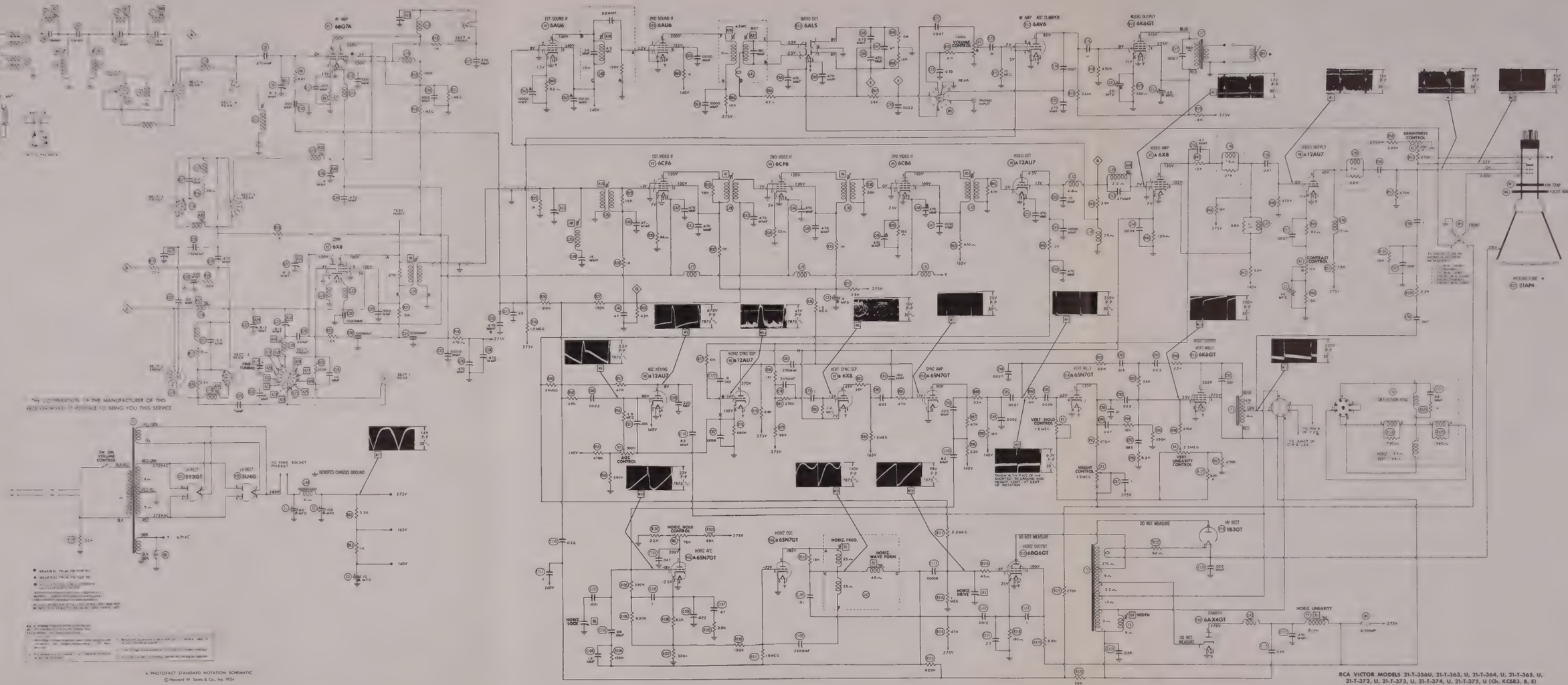

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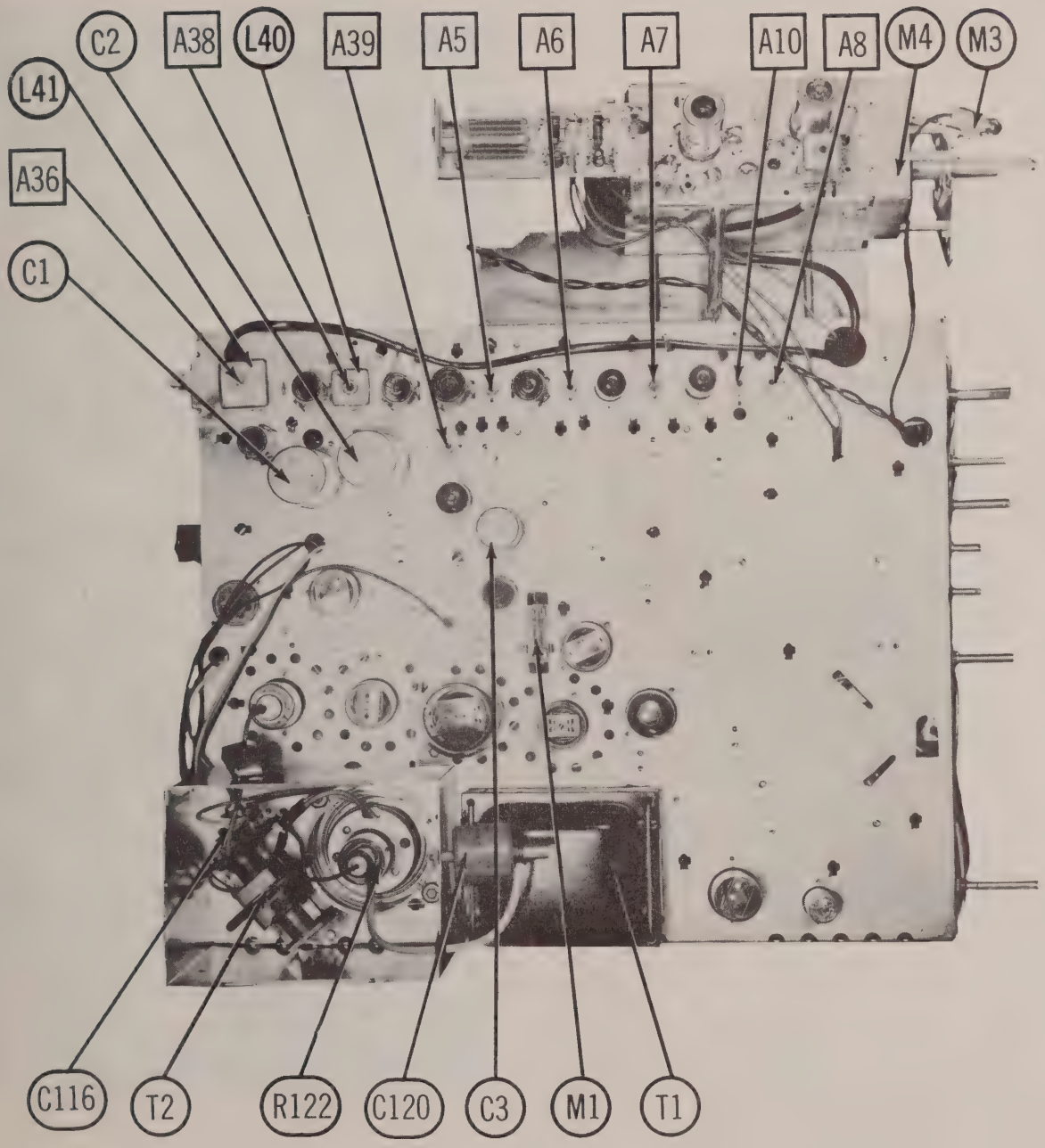

CHASSIS TOP VIEW

For tube location see tube placement chart page 10

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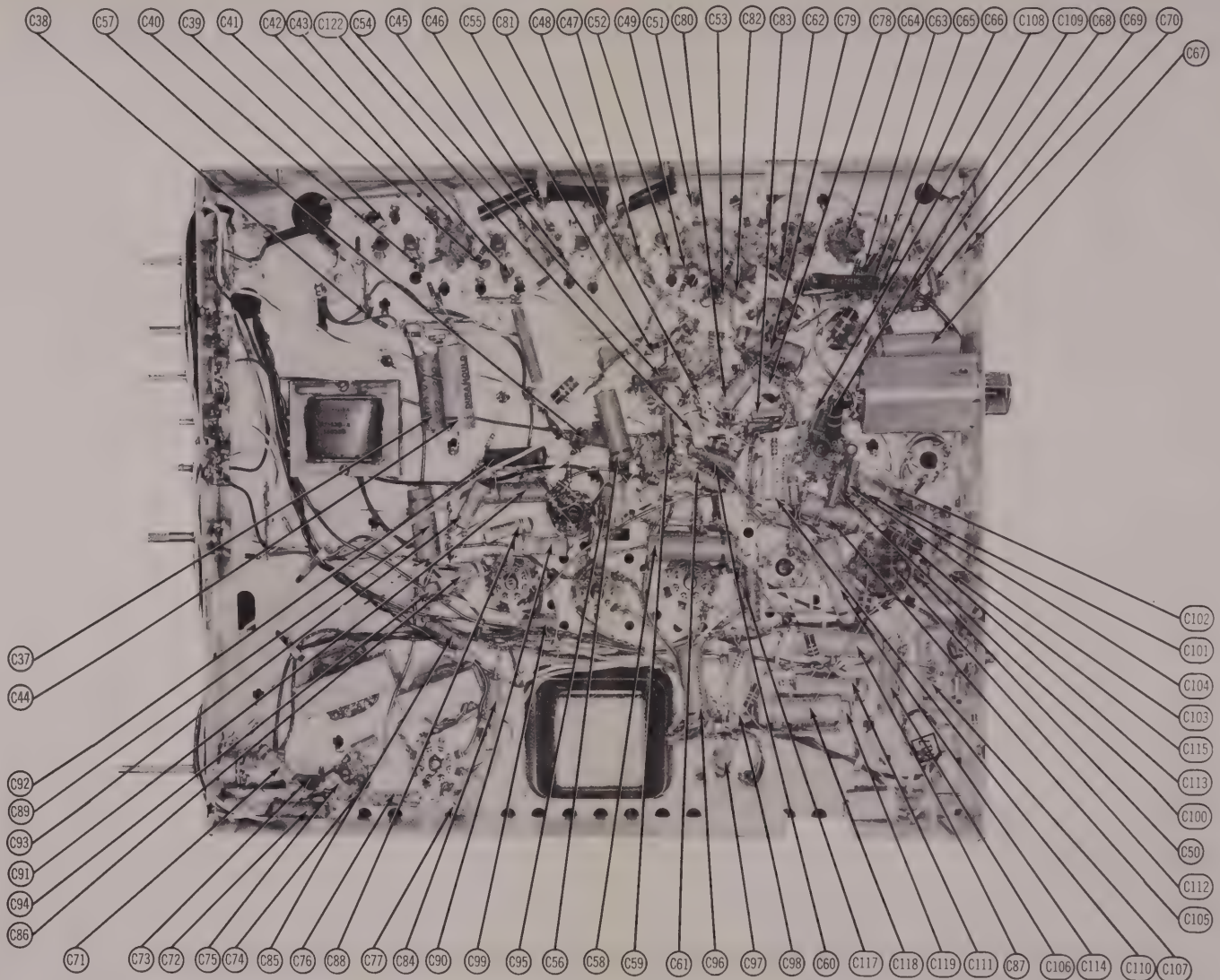

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube V16.

KRK29 ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. If a new antenna unit is installed, the RF unit should be realigned. Alignment should not be attempted without the proper alignment facilities.
The FM trap which is located on the antenna matching unit may be adjusted without affecting the RF alignment.
Disconnect the lead from the FM trap (L7) to the channel selector switch. Use a short jumper to connect point (A) on the matching unit through a .001MFD capacitor to pin 1 (grid) of 6CF6 (V4). Remove 6CF6 (V3) from its socket. Cover of matching unit must be in place during alignment. Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain. Connect the positive terminal to the chassis and the potentiometer arm to the junction of R27 and R28. Set the potentiometer arm to obtain - 5 volts at this point.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not used	45.75MC (400∿Mod)	Any	Vert. Amp. to point (B). Low side to chassis.	A1	Set oscilloscope gain to maximum and adjust A1 for MINIMUM 400∿ response on scope.
2.	"	"	"	41.25MC (400∿Mod)	"	"	A2	"
3.	"	"	50MC (20MC Swp)	50MC 52MC 53MC 60MC	"	Vert. Amp. thru detector probe (Fig. 1) to point (A). Low side to chassis.	A3, A4	Remove the .001MFD capacitor (see instructions above) from point (A) and connect a 300Ω ½ watt carbon resistor from point (A) to chassis using short leads. Adjust A3 and A4 to obtain response curve as in Fig. 2. Repeat steps 1, 2 and 3 until no further improvement is made. Remove the 300Ω resistor and the detector probe. Restore the connection between L7 and the channel switch. Replace V3.

VIDEO IF ALIGNMENT FOR RECEIVERS USING VHF TUNER KRK-29

Turn AGC control maximum clockwise.
Connect the bias supply as under antenna matching unit alignment and adjust for - 5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to terminal "A" of L26. Low side to chassis.	Not used	44.5MC	Any not used locally	Use VTVM DC probe to point (B). Common to chassis.	A5	Adjust for maximum deflection. Attenuate generator to maintain not more than 3 volts on VTVM.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	.0015MFD ceramic capacitor	High side thru .0015MFD to point (C). Low side to tuner chassis. Use very short leads.	43MC (10MC Swp)	42.5MC 45.75MC 47.25MC	4	Vert. amp. of scope thru detector (Fig. 1) to pin 5 (plate) of 6CF6 (V3). Low side to chassis.	A9, A10, A11	Preset A11 to minimum capacity. Clip 330Ω carbon resistors across primaries of L30 and L32. Connect 180Ω carbon resistor from plate to screen of 6CF6 (V3). Adjust A9 and A10 for maximum gain with 45.75MC at 75% response, as in Fig. 3. Attenutate generator to maintain .3 volt peak to peak response on scope. Adjust A11 to place 42.5MC at 70% on response curve.
9.	"	"	"	42.5MC 45.0MC 45.75MC 46.5MC	"	Vert. amp. to point (B). Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Adjust output of generator for 3 volts peak to peak on scope. Retouch A5, A6, and A7. for response similar to Fig. 4.

VIDEO IF ALIGNMENT FOR RECEIVERS USING VHF-UHF TUNER KRK-12A

Turn the AGC control maximum clockwise.
Connect the bias supply as under antenna matching unit alignment and adjust for - 5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.0015MFD ceramic capacitor	High side thru .0015MFD to front terminal of crystal mixer (1N82). Low side to tuner chassis. Use very short leads.	Not used	44.5MC	Any not used locally.	Use VTVM DC probe to point (A). Common to chassis.	A5	Adjust for maximum deflection. Attenuate generator to maintain not more than 3 volts at VTVM.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	"	"	43MC (10MC Swp)	42.5MC 45.75MC 47.25MC	5	Vert. amp. to scope thru detector probe (Fig. 1) to pin 5 (plate) of 6CF6 (first video IF Amp.). Low side to chassis.	A9, A10, A11, A12	Clip 330Ω resistors across primary of 3rd and 4th video IF transformers. Connect 180Ω carbon resistor from plate to screen of 6CF6 (first video IF amp.). Preset A11 to minimum capacity. Adjust A9 and A10 for maximum gain at 43.5MC with 45.75MC at 75% as in Fig. 3. A11 is a bandwidth adjustment. Adjust A12 for maximum gain. If necessary, retouch A9 and A10 for response similar to Fig. 3.
9.	"	"	"	42.5MC 45.0MC 45.75MC 46.5MC	"	Vert. amp. to point (A). Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Adjust output on generator for 3 to 5 volts peak to peak on scope. Retouch A5, A6 and A7 for response similar to Fig. 4.

RCA VICTOR MODELS 21-T-356U, 21-T-363, U, 21-T-364, U, 21-T-365, U, 21-T-372, U, 21-T-373, U, 21-T-374, U, 21-T-375, U (Ch. KCS83, B, E)

ALIGNMENT INSTRUCTIONS (cont)

KRK-29 TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no pre-setting of adjustments. Where complete alignment is necessary make the following pre-adjustments:

1. Preset A12 all the way out.
2. Set channel 7 to 13 oscillator slugs one turn from tight.
3. Adjust A9 so that the slug is all the way out.

Disconnect the link from terminals "A" and "B" of L26 and terminate the link with a 39Ω carbon resistor.
Connect the potentiometer arm of the bias supply to the AGC terminal on the tuner. Connect the positive lead to the tuner chassis. Adjust the bias supply to produce - 3 volts at AGC terminal of tuner.
(Temporarily disconnect bias supply until step 10 has been completed)
Tuner alignment as outlined below requires the use of a heterodyne frequency meter.
The limits for oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point (D) with a VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to point (A). Low side to chassis.	Not used	43.5MC (400% Mod)	2	Vert. Amp. to point (D). Low side to chassis.	A13	To be sure that 43.5MC trap is adjusted with zero bias short tuner AGC terminal to ground. Set scope gain to maximum. Adjust signal generator for maximum output. Adjust A13 for MINIMUM 400% indication on scope. Remove AGC jumper to ground and reconnect bias to AGC terminal.
11.		RF input of heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A17.	"	Set freq. meter to 227MC	8	Not used	A15, A12	Present A14 for -3 volts on VTVM at point (D). Turn fine tuning control maximum clockwise. Adjust A15 for audible beat on freq. meter. Adjust A12 clockwise until beat note just begins to change, then turn one full turn in same clockwise direction. Return fine tuning control to its mid-range position.
	Note: If channel 8 oscillator frequency cannot be reached by adjustment of A15 switch to channel 13 and adjust A16 for channel 13 oscillator frequency then switch to channel 12 and adjust A18 for channel 12 oscillator frequency. Continue down to channel 8 and adjusting proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also, on channel 8, adjust A15 for channel 8 oscillator frequency. Switch to channel 13 and adjust A16 then switch back to channel 8 and adjust A15 again.							
13.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	163MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point (D). Low side to chassis.	A29, A17, A30, A31	Set A9 to maximum counter clockwise rotation. Set scope gain to maximum and attenuate signal generator for minimum input signal which will produce usable pattern on scope. Adjust A29, A17, A30 and A31 for response similar to Fig.5. Adjust A31 for maximum amplitude between markers. A30 affects the pass band. A29 affects the tilt. A17 affects the response band width.
13.	Connect the DC probe of VTVM to point (D). Common to chassis. Adjust A14 for -3 volts at point (D). Repeat step 12 until proper response is obtained.							
14.		Connect freq. meter as in step 11.	Not used	Freq. meter to 257MC	13	Not used	A16	Turn fine tuning control maximum clockwise. Adjust A16 for audible beat on freq. meter. SLIGHTLY overshoot the adjustment an additional turn in the same direction, then adjust A12 to again obtain an audible beat.
15.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point (D). Low side to chassis.	A32 A33	Adjust for response similar to Fig.5. Turn off generator and check oscillator injection voltage at point (D) using VTVM as in step 13. If A14 required readjustment turn sweep generator back on and recheck channel 13 response. If necessary, retouch A32 and A33 to obtain desired response.
16.		Connect freq. meter as in Step 11.	Not used	Freq. meter to 227MC	8	Not used	A12	Check for audible beat on freq. meter. If necessary, adjust A12 for proper oscillator frequency.
17.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	163MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point (D). Low side to chassis.	A29, A17, A30, A31	If necessary, retouch A29, A17, A30 and A31 to obtain response similar to Fig.5. If A29 required adjustment turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 15. If necessary repeat steps 15, 16 and 17.
18.		Connect freq. meter as in Step 11.	Not used	Freq. meter to 139MC	6	Not used	A24	Set fine tuning control to its mid-range position. Adjust A24 for audible beat on frequency meter.
19.	Two 130Ω Carbon Resistors	Across antenna terminals with 130 Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point (D). Low side to chassis.	A34, A35	Adjust for response curve similar to Fig.5. Check oscillator injection voltage as in Step 15. Readjust A34 if necessary.
20.	If A14 required adjustment switch receiver and generator to channel 8. Retouch A29 for response similar to Fig.5. Recheck A12 and A15 for proper oscillator frequency as in Step 11.							
21.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point (D). Low side to chassis.		Check for response similar to Fig. 5. Check oscillator injection voltage for each channel at point (D). Marker response should not fall below 80% on any channel. If markers fall below 80% on response curve, retouch A34 and A35 to obtain proper response.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
22.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			Check for response similar to Fig.5. Check oscillator injection voltage for each channel at point (D). If markers fall below 80% on any channel retouch A17, A29 and A30 for proper response.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			

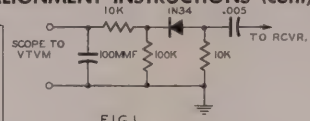

FIG.1

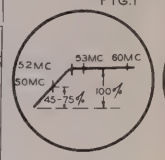

FIG.2

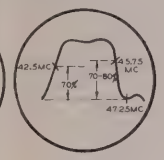

FIG.3

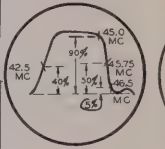

FIG.4

FIG.5

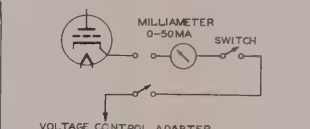

FIG.6

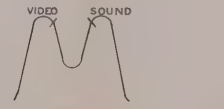

FIG.7A

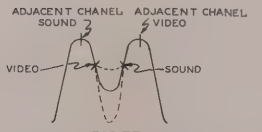

FIG.7B

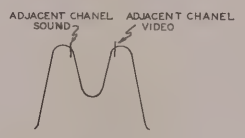

FIG.7C

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
23.		Connect freq. meter as in Step 11.	Not used	Freq. meter to 257MC	13	Not used	A16	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point (D) to verify that the voltage is within the limits (2 volts maximum and 5.5 volts minimum) Continue alignment with Step 33.
				213MC	12		A18	
				245MC	11		A19	
				239MC	10		A20	
				233MC	9		A21	
				227MC	8		A22	
				221MC	7		A23	
				139MC	6		A24	
				123MC	5		A25	
				113MC	4		A26	
				107MC	3		A27	
				101MC	2		A28	

KRK-12A VHF TUNER ALIGNMENT

It is necessary to meter the non-oscillating plate current of the 6S4 voltage control tube. This can be accomplished by use of an adapter or similar arrangement. The circuit diagram for the adapter is shown in Fig. 6. Remove the 6S4 from its socket and insert the adapter plug. Plug the 6S4 into the adapter.
Connect a 0-50 milliameter to adapter and turn the switch on.
Remove the tuner cover shield.
Set channel selector switch midway between channels to disable local oscillator. Some tubes may oscillate even with the tuned circuits disengaged. As a check short circuit the spring contacts 12 and 13, nearest the tuner front, with a finger (contacts are at zero DC potential). If plate current rises keep finger on contacts while adjusting the oscillator voltage control for 28MA indication on the meter. Replace tuner cover.
The oscilloscope used should have a sensitivity of 1 millivolt per inch. If sensitivity is less a suitable preamplifier may be used with the scope.
A heterodyne frequency meter is used while making VHF oscillator adjustments.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
24.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	57MC (20MC Swp)	55.25MC 59.75MC	2	Vert. amp. to point (B). Low side to chassis.	A13, A14, A15, A16	Ground the AGC line at the tuner terminal board. Turn off adapter switch removing plate voltage from oscillator. Adjust for response similar to Fig. 7B. Do no exceed limits shown in Fig. 7A and Fig. 7C. Each channel strip adjustment for an individual channel strip has a corresponding adjustment on all other VHF channel strips. Since these adjustments are identical in position and function they are indicated by the same "A" number in the interests of simplification. Adjustments A13, A14, A15 are accessible thru holes in top of tuner as the channel switch is turned to each channel. Adjustment A16 refers to coupling capacitor whose positioning affects bandwidth of response curve.
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			75MC (20MC Swp)	77.25MC 81.75MC	5			
			85MC (20MC Swp)	83.25MC 87.75MC	6			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
			183MC (20MC Swp)	181.25MC 185.75MC	8			
			189MC (20MC Swp)	187.25MC 191.75MC	9			
			195MC (20MC Swp)	193.25MC 197.75MC	10			
			201MC (20MC Swp)	199.25MC 203.75MC	11			
			207MC (20MC Swp)	205.25MC 209.75MC	12			
			213MC (20MC Swp)	211.25MC 215.75MC	13			
25.	Turn off the sweep generator and remove the scope from point (B). Turn the AGC control fully clockwise. Remove the ground placed on the AGC line in the above step. Connect the potentiometer arm of the bias, supply to the tuner AGC terminal. Connect the positive lead to the tuner case. Adjust for -3.5 volts at AGC terminal. Connect the potentiometer arm of a second bias supply to point (D). Connect the positive lead to chassis. Adjust for-5 volts at point (D). Turn on the 6S4 adapter switch to apply plate voltage to the oscillator. Connection of the heterodyne frequency meter for oscillator adjustment is made as follows: Insert the end of an insulated piece of wire into either of two holes next to the oscillator tube at the right front top, corner of the tuner. Use care so that wire does not touch any tuned circuits. Connect other end of wire to RF input of frequency meter.							
26.		Connect freq. meter as in step 25.	Not used	Freq. meter to 257MC	13	Not used	A17	Set fine tuning control to its mid-range position. Adjust for audible beat on freq. meter.
27.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. amp. to point B . Low side to chassis. (Use 3 to 5 volts peak to peak output on scope).	A12, A15	Adjust A12 for maximum gain on scope. Adjust A15 for maximum gain and flat topped curve. Recheck A12 for maximum gain at center of band.
28.		Connect as freq. meter as in step 25.	Not used	Freq. meter to 213MC	12	Not used	A17 A15	Adjust A17 on each channel for audible beat. Connect sweep generator and scope as in step 27. Set sweep and marker to proper frequencies (see chart) for each channel and adjust A15 if necessary for maximum gain and proper response curve.
				245MC	11			
				239MC	10			
				233MC	9			
				227MC	8			
				221MC	7			
				129MC	6			
				123MC	5			
				113MC	4			
				107MC	3			
				101MC	2			
29.	Direct	High side to point (A). Low side to chassis.	Not used	43.5MC (400% Mod)	Any	Vert. amp. to point B . Low side to chassis.	A18	Adjust for MINIMUM 400% indication on scope.

FIG.8

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RCA VICTOR MODELS 21-T-356U, 21-T-363, U, 21-T-364, U, 21-T-365, U, 21-T-372, U, 21-T-373, U, 21-T-374, U, 21-T-375, U (Ch. KCS83, B, E)

ALIGNMENT INSTRUCTIONS (cont)

KRK-12A UHF TUNER ALIGNMENT

Alignment of the UHF portion of the tuner should not be attempted unless the following test equipment is available, in addition to the usual VHF test equipment:
(a) UHF sweep generator covering the frequency range of 470 MC to 890 MC.
(b) Marker generator of crystal accuracy covering the same frequency range.
Leave the 6S4 adapter connected as under KRK-12A VHF tuner alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
30.	10DB Attenuator Pad	Sweep generator thru attenuator to antenna terminals. Connect UHF marker generator loosely to antenna terminals.	Set sweep to cover channel being aligned (see chart) Use 20MC Swp width.	Set to video and sound frequency of channel being aligned (see chart)	14 thru 83	Vert. Amp. to point (H). Low side to chassis.	A14, A15 A19	Turn off the adaptor switch removing plate voltage from the oscillator. Ground the AGC line at the tuner terminal board. Adjust for maximum gain and symmetrical response curve centered about the pass band. Set Fig.8 for acceptable variations.
31.	Connect both bias supplies and adjust as in step 25. Remove the ground from the AGC line. Turn the adaptor switch on to apply plate voltage to the oscillator. Connect the VHF signal generator to point H using very short leads. Set generator to 45.75MC for remainder of tuner alignment.							
32.	10DB Attenuator Pad	Sweep generator thru attenuator to antenna terminals. Connect UHF marker generator loosely to antenna terminals.	Set sweep to channel being aligned (see chart) Use 20MC Swp.	Set to video carrier frequency of channel being aligned (see chart)	14 thru 83	Vert. amp. to point (B). Low side to chassis. (Use 3 to 5 volts peak to peak output on scope)	A17	Adjust A17 for channel strip being aligned until 45.75MC marker and video carrier marker coincide on response curve. Adjust A19 of channel strip being aligned for maximum gain with proper waveshape. Connect VTVM to point H. Common to chassis. Set oscillator injection adjustment for reading on VTVM of .1 volt. Check all channels. Adjust oscillator injection voltage control only if VTVM reads more than .3 volt.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
33.	.001MFD	High side to pin 1 (grid) of 6AU6 (V9). Low side to chassis.	4.5MC (Unmod)	Any not used locally	DC probe to point (E) Common to chassis.	A36	Adjust for maximum deflection. Adjust generator output so that A36 peaks at 6 volts on VTVM.
34.	"	"	"	"	DC probe to point (E) Common to chassis.	A37	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 33 and 34 making final adjustments with generator output set to produce 6 volts at point (E).
35.	"	"	"	"	DC probe to point (E) Common to chassis.	A38	Adjust for maximum deflection as in step 33.

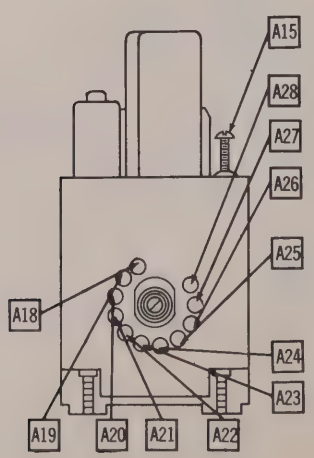
4.5MC TRAP ALIGNMENT

Short pin 1 (grid) of 6CB6 (V5) to chassis to prevent noise from masking output indication.

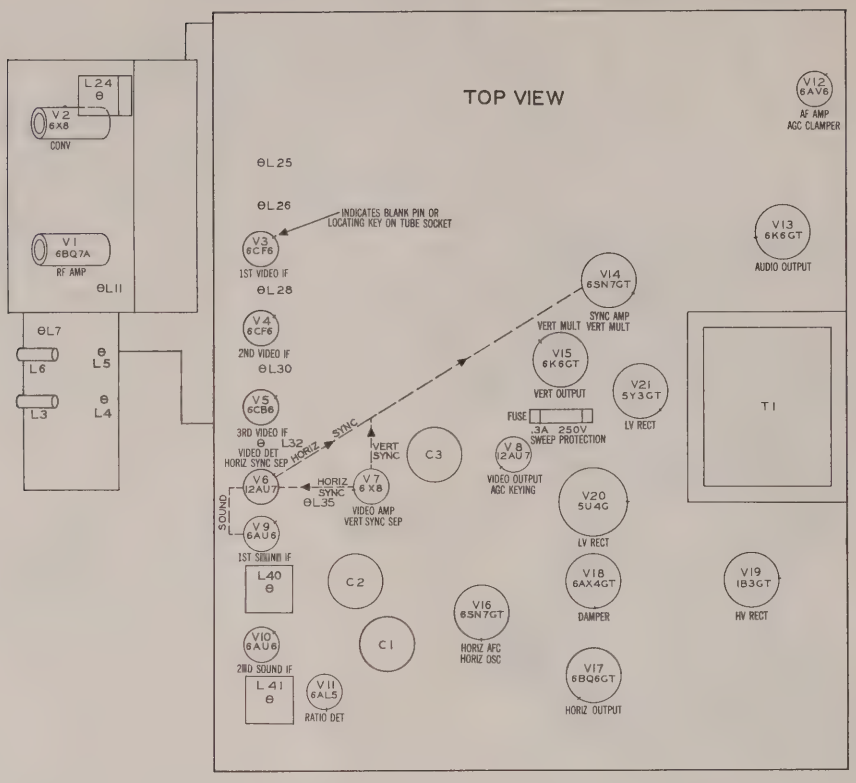
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
36.	1000Ω Carbon Resistor	High side thru 1000Ω to pin 2 (grid) of 12AU7 (V6A). Low side to chassis.	Not used	4.5MC (400~Mod)	Any	Vert. Amp. thru detector (Fig.1) to pin 9 (plate) of 6X8 (V7A). Low side to chassis.	A39	Set generator output to approximately .5 volts. Adjust A39 for MINIMUM 400~ indication on scope. Remove short from pin 1 of V5.
37.	An alternate method of adjusting the 4.5MC trap is to tune in a TV station and examine the picture for 4.5MC beat interference. If beat is present in picture when the fine tuning control is set for proper oscillator frequency turn fine tuning control slightly clockwise to emphasize the beat and then adjust A39 for minimum beat.							

TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75
3	60-66	61.25	65.75
4	66-72	67.25	71.75
5	76-82	77.25	81.75
6	82-88	83.25	87.75
7	174-180	175.25	179.75
8	180-186	181.25	185.75
9	186-192	187.25	191.75
10	192-198	193.25	197.75
11	198-204	199.25	203.75
12	204-210	205.25	209.75
13	210-216	211.25	215.75
14	470-476	471.25	475.75
15	476-482	477.25	481.75
16	482-488	483.25	487.75
17	488-494	489.25	493.75
18	494-500	495.25	499.75
19	500-506	501.25	505.75
20	506-512	507.25	511.75
21	512-518	513.25	517.75
22	518-524	519.25	523.75
23	524-530	525.25	529.75
24	530-536	531.25	535.75
25	536-542	537.25	541.75
26	542-548	543.25	547.75
27	548-554	549.25	553.75
28	554-560	555.25	559.75
29	560-566	561.25	565.75
30	566-572	567.25	571.75
31	572-578	573.25	577.75
32	578-584	579.25	583.75
33	584-590	585.25	589.75
34	590-596	591.25	595.75
35	596-602	597.25	601.75
36	602-608	603.25	607.75
37	608-614	609.25	613.75
38	614-620	615.25	619.75
39	620-626	621.25	625.75
40	626-632	627.25	631.75
41	632-638	633.25	637.75
42	638-644	639.25	643.75
43	644-650	645.25	649.75
44	650-656	651.25	655.75
45	656-662	657.25	661.75
46	662-668	663.25	667.75
47	668-674	669.25	673.75
48	674-680	675.25	679.75
49	680-686	681.25	685.75
50	686-692	687.25	691.75
51	692-698	693.25	697.75
52	698-704	699.25	703.75
53	704-710	705.25	709.75
54	710-716	711.25	715.75
55	716-722	717.25	721.75
56	722-728	723.25	727.75
57	728-734	729.25	733.75
58	734-740	735.25	739.75
59	740-746	741.25	745.75
60	746-752	747.25	751.75
61	752-758	753.25	757.75
62	758-764	759.25	763.75
63	764-770	765.25	769.75
64	770-776	771.25	775.75
65	776-782	777.25	781.75
66	782-788	783.25	787.75
67	788-794	789.25	793.75
68	794-800	795.25	799.75
69	800-806	801.25	805.75
70	806-812	807.25	811.75
71	812-818	813.25	817.75
72	818-824	819.25	823.75
73	824-830	825.25	829.75
74	830-836	831.25	835.75
75	836-842	837.25	841.75
76	842-848	843.25	847.75
77	848-854	849.25	853.75
78	854-860	855.25	859.75
79	860-866	861.25	865.75
80	866-872	867.25	871.75
81	872-878	873.25	877.75
82	878-884	879.25	883.75
83	884-890	885.25	889.75



TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V20, V21**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V8, V22**
Has pic, no sound - **V9, V10, V11, V12, V13**
Overloaded picture - **V8, V12**

SYNC FAILURE
No vert. sync - **V14, V15**
No horiz. sync - **V14, V16**
No vert. or horiz. sync - **V14**

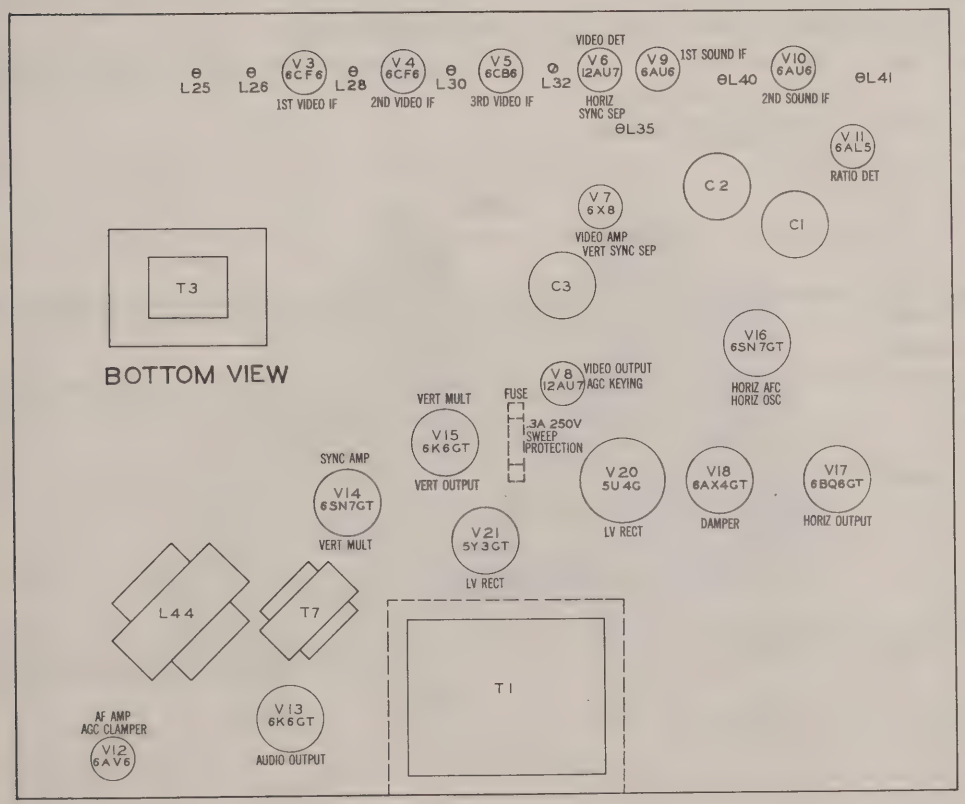
SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V22, Fuse (M1)**
No vertical deflection - **V14, V15**
Poor vert. linearity or foldover - **V14, V15**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, V20, V21**
Vert. off freq. - **V14, V15**
Horiz. off freq. - **V14, V16**

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	† 1. 5KΩ	400KΩ	500KΩ	0Ω	.1Ω	500KΩ	300KΩ	120Ω	0Ω
V 2	6X8	0Ω	100KΩ	† 12. 5KΩ	0Ω	.1Ω	0Ω	100KΩ	† 15. 5KΩ	† 15. 5KΩ
V 3	6CF6	44KΩ	68Ω	0Ω	.1Ω	† 4. 8KΩ	† 4. 8KΩ	0Ω		
V 4	6CF6	43KΩ	33Ω	0Ω	.1Ω	† 4. 8KΩ	† 4. 8KΩ	0Ω		
V 5	6CB6	.2Ω	180Ω	.1Ω	0Ω	† 3. 8KΩ	† 3, 8KΩ	0Ω		
V 6	12AU7	2 Meg	3. 9KΩ	.3Ω	.1Ω	.1Ω	† 6. 8KΩ	† 28KΩ	400KΩ	0Ω
V 7	6X8	0Ω	2. 2Meg	† 1. 2Meg	.1Ω	0Ω	120Ω	3. 9KΩ	† 6. 6KΩ	† 17KΩ
V 8	12AU7	240KΩ	† 4. 6Meg	† 4. 3KΩ	.1Ω	.1Ω	† 7. 5KΩ	470KΩ	2. 6KΩ	0Ω
V 9	6AU6	7. 5Ω	0Ω	0Ω	.1Ω	† 4. 3KΩ	† 4. 3KΩ	82Ω		
V 10	6AU6	120KΩ	0Ω	0Ω	.1Ω	† 10KΩ	† 5. 3KΩ	0Ω		
V 11	6AL5	10KΩ	10KΩ	# 0Ω	.1Ω	INF	0Ω	INF		
V 12	6AV6	10Meg	0Ω	0Ω	.1Ω	330KΩ	330KΩ	† 330KΩ		
V 13	6K6GT	INF	0Ω	† 2. 2KΩ	† 1. 8KΩ	470KΩ	INF	.1Ω	560Ω	
V 14	6SN7GT	† 1. 5Meg	† 11. 5KΩ	0Ω	1. 3Meg	▲ 2. 5Meg	0Ω	.1Ω	0Ω	
V 15	6K6GT	INF	.1Ω	† 580Ω	† 41Ω	1. 6Meg	INF	0Ω	0Ω	
V 16	6SN7GT	1. 5Meg	† 33KΩ	410KΩ	480KΩ	† 47KΩ	0Ω	.1Ω	0Ω	
V 17	6BQ6GT	INF	.1Ω	INF	† 6. 8KΩ	1Meg	3. 2Meg	0Ω	180Ω	TOP CAP ▲ 9Ω
V 18	6AX4GT	INF	INF	1Meg	INF	† 65Ω	INF	0Ω	.1Ω	
V 19	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 380Ω
V 20	5U4G	INF	50KΩ	INF	16Ω	INF	15Ω	INF	50KΩ	
V 21	5Y3GT	INF	50KΩ	INF	15Ω	INF	16Ω	INF	50KΩ	
V 22	21AP4	# 0Ω	470KΩ	PIN 10 ▲# 325KΩ	PIN 11 † 320KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V20.
# MEASURED WITH TV-phono switch in TV position.
▲ MEASURED FROM PIN 3 of V18.

PROPERTY OF
F. BLANKENSHIP
3921 WILDE ST.
DENVER, COLORADO



TUBE PLACEMENT CHART

SET 232 FOLDER 5

RCA VICTOR MODELS 21-T-356U, 21-T-363, U, 21-T-364, U, 21-T-365, U, 21-T-372, U, 21-T-373, U, 21-T-374, U, 21-T-375, U (Ch. KCS83, B, E)

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OS SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21. Check adjustments B3. B4 and B5. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check R118, R119, T2, T4A, C114, C118, C119 and other associated circuit components.	Check C108, C109, C112, C113, L42, R111, R114, R116 and other components associated with V16 and V17.

DRIVE LINES

Check horizontal drive adjustment (B3). Check by substitution V16, V17 and V18. Check T2, T4A, C112, C113, C118, C119, R116 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V16, V17 and V18. Check adjustments B3, B4 and B5. Check components associated with the horizontal output and damper stages especially T2 and T4A.

FOLDS FOLD

Follow procedure outlined under "Drive Lines".

XMAS TREE EFFECT

Substitute V16. Check L42, C108, C109, C112, C113 and other associated components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T3, T4B and other associated components.	Check R120, R121, R91, R3, C90 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT TOP

Check by substitution V14 and V15. Check T3, T4B and other associated circuit components.

FOLDS

Check by substitution V14 and V15. Check associated circuit components especially C88, C89 and C90.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V6, V7, V8 and V14. Check components associated with these stages especially those associated with V14A.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V7 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V14B and V15.	Check components associated with V14A and V7B.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V16. Check components associated with V16 especially C100, C103, C102, C108, C109, L42 and R111 for change of value or failure.

HORIZONTAL BENDING

Check by substitution V16 and V17. Check horizontal AFC filter network (C106, C107, R106, R107, R109, R110) for failure or change of value.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check picture tube and other associated circuit components.

SOUND BARS (4. 5MC BEAT)

Check adjustment and range of fine tuning. Check adjustment A39. Check video IF alignment.

POOR CONTRAST

Check by substitution V6, V7 and V8. Check picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V6, V7 and V8. Check picture tube and other associated circuit components especially the AGC network.

SMEAR

Check by substitution V6, V7 and V8. Check R45, R46, R48, R49, R50, R52 R51, R1A, C56, C58, L36, L37, L39, picture tube and other associated circuit components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V1, V2, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11, V12 and V13. Check stages of V12 and V13 using audio signal generator. Apply audio signal across R71.

If Satisfactory	If Unsatisfactory
Check audio IF and ratio detector alignment and components.	Check components associated with V12 and V13.

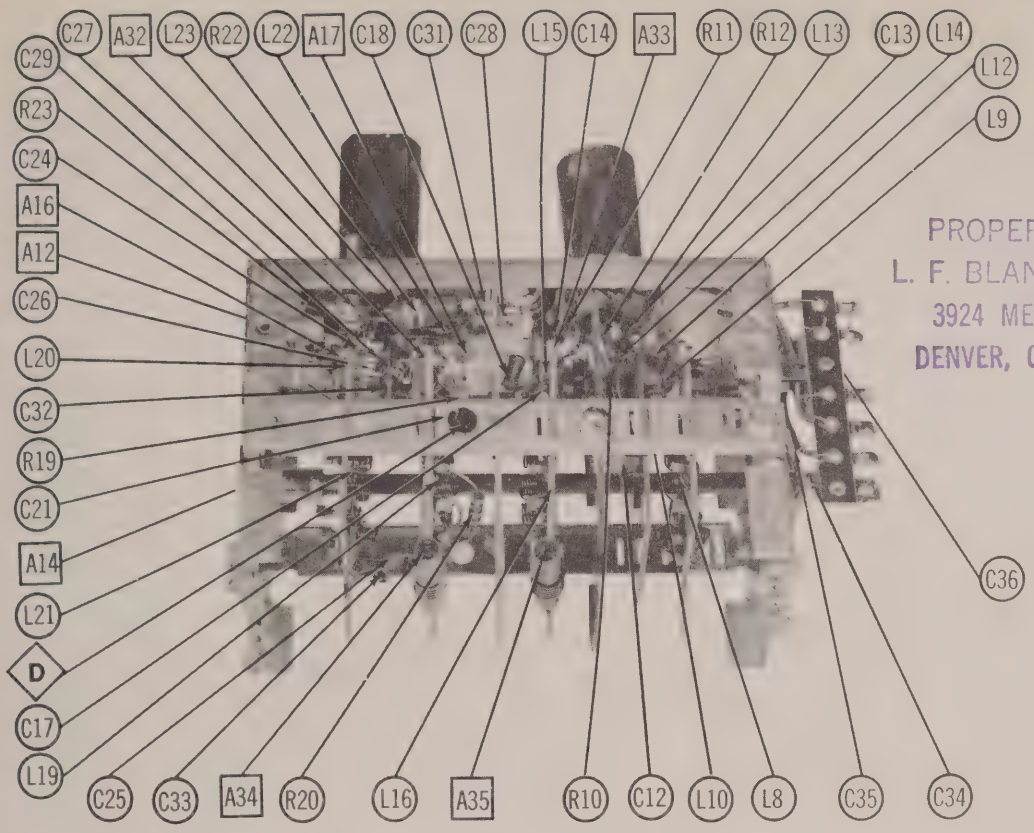
BUZZ

Adjust fine tuning for best picture and sound. Adjust A37 for minimum buzz. If buzz is still objectionable substitute V11 and realign audio IF and detector stages. Follow procedure outlined in the alignment section.

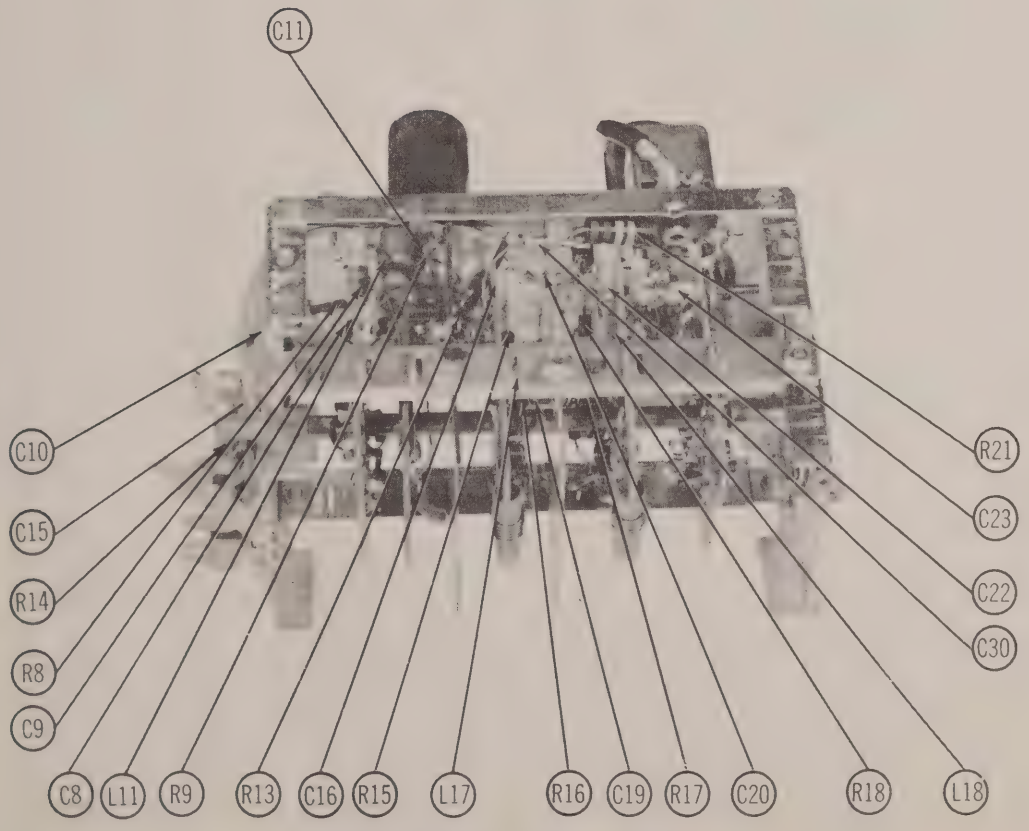
DISTORTED

Follow procedure outlined under "Weak or No Sound".

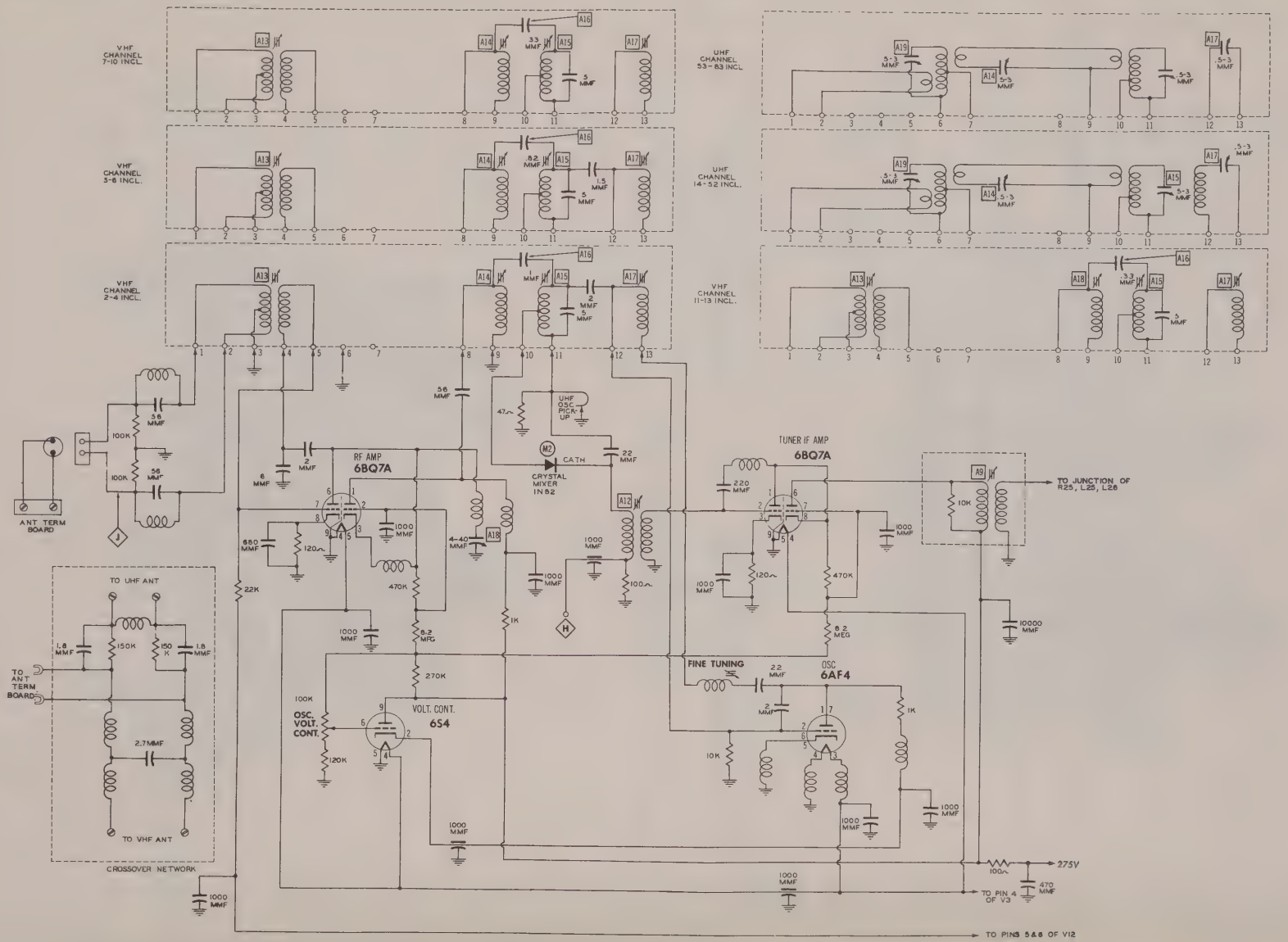
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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MODEL KRK 12A VHF-UHF TUNER USED ON CHASSIS KCS83B&E

ALTERNATE TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CF6	6CF6	7CM	
V4	2nd. Video IF Amp.	6CF6	6CF6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-Horiz. Sync Separator	12AU7	12AU7	9A	
V7	Video Amplifier-Vert. Sync Separator	6X8	6X8	9AK	
V8	Video Output-AGC Keying	12AU7	12AU7	9A	
V9	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier-AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Sync Amplifier-Vert. Mult.	6SN7GT	6SN7GT	8BD	
V15	Vert. Mult.-Vert. Output	6K6GT	6K6GT	7S	
V16	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6BQ6GT	6BQ 6GT	6AM	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	LV Rectifier	5Y3GT	5Y3GT	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22A	21AP4	21AP4	21AP4	21AP4	12D	① Circuit changes necessary.
B	21EP4A	21EP4A 21EP4 ①	21EP4A 21EP4 ①	21EP4A	12D 12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	77644	AFH2-63		CO36		FP444.8	TVL-2673	
B	▲20	400								
C2A	▲100	400	78212	AFH4-07		C152		FP431.4	TVL-3672	
B	▲20	50								
C3A	■10	350	78213	AFH3-136		C153		FP231	TVL-3637	
B	▲5	350						TC47		
C	30	50								
C4	18		54207							
C5	5		93056	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C6	27		70935							
C7	33		76739	SI33NP0	TCZ-33		NP0K-330	ZT-5433	5TCC-Q33	
C8	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C9	.8-3				829-3			CT565A		
C10	1000		77084	EF-001	MFT-1000				503C-D1	
C11	1000		77252	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C12	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C13	1000		77252	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C14	1000		77252	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C15	10000		73960	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C16	1-4				829-4			CT551		
C17	2.2		71502	SI2.2NP0	TCZ-2.2		NP0K-2R2		5TCCB-V22	
C18	150		78276	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C19	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C20	1000		77084	EF-001	MFT-1000				503C-D1	
C21	3.3		71503	SI3.3NP0	TCZ-3.3		NP0K-3R3		5TCCB-V33	
C22	.8-3		77151		829-3			CT565A		
C23	.8-3		77913		829-3			CT565A		
C24	10		78247	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C25	.7		71504							
C26	10		77865	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C27	.8-3		77151		829-3			CT565A		
C28	1000		77084	EF-001	MFT-1000				503C-D1	
C29	1000		77252	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C30	1000		77084	EF-001	MFT-1000				503C-D1	
C31	1000		77084	EF-001	MFT-1000				503C-D1	
C32	100		75437	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C33	10		77865	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C34	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C35	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	Note 1
C36	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C37	.22	200	73794	P488-22		PTE4P22		PT4025	4TM-P22	
C38	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA- T47	
C39	15		39044	SI15N750	TCN-15		N750K-150		5TCU-Q15	
C40	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C41	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C42	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C43	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C44	.47	200	73787	P288-47		PJ2P5		PT405	2TM-P47	
C45	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C46	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C47	1000		77252	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48A	470		77672	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
B	470			BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C49	10000		73960	BPD-01	DD-103	TM581	5U-01	DC-511	5HK-S1	
C50	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C51	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C52	10		33098	91D0N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C53	47	500		1469-00005		5R5Q5			MS-45	
C54	.0039	400	73796							
C55	47		31047	5147N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C56	.047	600	73592	P688-047	DF-503	PTE4847		PT4147	4TM-S47	
C57	.0027	400	73599					PT601	6TM-P1	
C58	.1	600	73557	P688-1	DF-104	PTE6P1				
C59	220	1000	75248							
C60	.0022	600	73595	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C61	.001	600	75643	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C62A	10000		76991	BPD-2X01	DD3-103	TM5D81	5U-01	DCD-511	5HK-S81	
B	10000						5U-01			
C63	10000		73960	BPD-01	DD-103	TM581	5U-01	DC-511	5HK-S1	
C64	10000		73960	BPD-01	DD-103	TM581	5U-01	DC-511	5HK-S1	
C65	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C66	470		77293	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C67	.47	200	73787	P288-47		PJP5		PT405	2TM-P47	
C68	470	500	39644	1469-0005		5R5T5			MS-35	
C69	470	500	39644	1469-0005		5R5T5			MS-35	
C70	.0022	600	73595	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C71	.0047	400	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C72	.033	200	73552	P488-033						
C73	.01	200	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C74	.0027	600	73599							
C75	270		41767	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C76	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C77	.0027	1600	73818							
C78	330	500	39840	1469-00035						
C79	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C80	.033	400	73552	P488-033						
C81	180		73798							
C82	.0039	600	73796							
C83	270	1000	76579							
C84	.0082	1000	73808							
C85	.0027	600	73599							
C86	.0039	600	78221							
C87	.1	600	73551	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C88	.01	600	73565	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C89	.047	600	73592	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C90	.0047	600	73798	P688-023		PTE6S23		PT6123	6TM-S23	
C91	.023	600	73798	P688-023		PTE6S23		PT6123	6TM-S23	
C92	560	200	73792							
C93	.015	400	73797							
C94	.0027	600	73599							
C95	.001	1000	75643	P1D88-001		PTE1D1		PT1S1	MB-D1	
C96	.047	600	73592	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C97	.0047	400	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C98	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C99	220	500	39536							
C100	82	1000	76474							
C101	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C102	.001	600	75643	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C103	68	1000	76475							
C104	12		33380							
C105	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C106	.022	400	73562	P488-022		PTE4S22		PT4122	4TM-S22	
C107	.47	200	73787	P288-47		PJP5		PT405	2TM-P47	
C108	330	1000	76476							
C109	.01	600	73594							
C110	.022	1000	73810							
C111	.1	400	73557	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C112	.0012	600	76995							
C113	.00068	600	78479							
C114	.1	600	73557	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C115	.27	200	73788							
C116	82	3500	78225							
C117	270	1000	76579							
C118	.039	1000	73813							
C119	.039	1000	73813							
C120	500	30000	78488							
C121	68									
C122	.001	600		P688-001		PTE6D1		PT621	6TM-D1	Note 1

Note 1. Not used in all Models.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	10KΩ	½	78208	* QJ-504	RTV-443		UF14L	Contrast - panel
B	1Meg		Not Req.				UR16-T254 †	Volume -rear tapped @ 250KΩ
C	Switch		Not Req.				U8-26	
R2A	200KΩ	½	78209	Q1J-129	AG-52-S	B-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	3.5Meg	½	78206	Q1J-141	AG-85-S	AB-86	U-67	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	2.5Meg	½	78207	Q1J-239	AG-84-S	AB-83	U-255	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	1.5Meg	½	78210	Q1J-138	AG-83-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	75KΩ	½	77639	Q1J-125	AG-47-S	AB-35	U-41	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R6A
R7A	500KΩ	½	78975	Q1J-133	AG-58-S	AB-59	SU-50	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS R17-18 & P1-200 (Panel)
R13-13TX & RJ-218 (Rear) & SWITCH 76-1.

† Universal replacement (Mallory exact duplicate Part. No UE7758).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R8	6800Ω	½		BTS-6800	
R9	120Ω	½		BTS-120	
R10	1000Ω	½		BTS-1000	
R11	1Meg	½		BTS-1Meg	
R12	100KΩ	½		BTS-100K	
R13	1Meg	½		BTS-1Meg	
R14	470Ω	½		BTS-470	
R15	1000Ω	½		BTS-1000	
R16	39Ω	½		BTS-39	
R17	15Ω	½		BTS-15	
R18	100KΩ	½		BTS-100K	
R19	100KΩ	½		BTS-100K	
R20	3300Ω	½		BTS-3300	
R21	15KΩ	2		BTS-15K	
R22	15KΩ	2		BTS-15K	
R23	15KΩ	2		BTS-15K	
R24	L. 5Meg 5%	½	502515	BTS-L. 5Meg 5%	
R25	1000Ω	½	503210	BTS-1000	
R26	180KΩ 5%	½	502418	BTS-180K 5%	
R27	150KΩ 5%	½	502415	BTS-150K 5%	
R28	1000Ω	½	503210	BTS-1000	
R29	15KΩ	½	503215	BTS-15K	
R30	68Ω 5%	½	502068	BTS-68 5%	
R31	56KΩ 5%	½	502256	BTS-56K 5%	
R32	1000Ω	½	503210	BTS-1000	
R33	43KΩ 5%	½	502243	BTS-43K 5%	
R34	33Ω 5%	½	502033	BTS-33 5%	
R35	1000Ω	½	503210	BTS-1000	
R36	L. 5Meg	½	502515	BTS-L. 5Meg	
R37	3800Ω	7	77671		
R38	56KΩ 5%	½	502256	BTS-56K 5%	
R39	180Ω 5%	½	502118	BTS-180 5%	
R40	3.9Meg	½	503539	BTS-3.9Meg	
R41	47KΩ	½	503347	BTS-47K	
R42	12KΩ	½	503312	BTS-12K	
R43	3900Ω 5%	½	502339	BTS-3900 5%	
R44	120Ω	½	503112	BTS-120	
R45	12KΩ	½	503312	BTS-12K	
R46	18KΩ	2	523318	BTS-18K	
R47	5600Ω	½	5032256	BTS-5600	
R48	470KΩ	½	503447	BTS-470K	
R49	180Ω	½	503118	BTS-180	
R50	1500Ω	½	503215	BTS-1500	
R51	7500Ω 5%	1	512275	BTA-7500 5%	
R52	470KΩ	½	503447	BTS-470K	
R53	270KΩ	½	503427	BTS-270	
R54	220KΩ	½	503422	BTS-220K	
R55	470KΩ	½	503447	BTS-470K	
R56	3.9Meg	½	503539	BTS-3.9Meg	
R57	47KΩ	1	513347	BTA-47K	
R58	68KΩ	½	503368	BTS-68K	
R59	390KΩ	½	503439	BTS-390K	
R60	82Ω	½	503082	BTS-82	
R61	1000Ω	1	513210	BTA-1000	
R62	3300Ω	7	77670		
R63	470Ω	½	503147	BTS-470	
R64	1000Ω	½	503210	BTS-1000	
R65	10KΩ	2	523310	BTS-10K	
R66	47Ω	½	503047	BTS-47	
R67	39KΩ	½	503339	BTS-39K	
R68	10KΩ 5%	½	502310	BTS-10K 5%	
R69	10KΩ 5%	½	502310	BTS-10K 5%	
R70	12KΩ	½	503312	BTS-12K	
R71	10Meg	½	503610	BTS-10Meg	
R72	330KΩ	½	503433	BTS-330K	
R73	560Ω	1	513156	BTA-560	
R74	470KΩ	½	503447	BTS-470K	
R75	1800Ω	3	523218	BTS-1800	
R76	68KΩ	½	503468	BTS-68K	
R77	10KΩ	½	503310	BTS-10K	
R78	6800Ω	½	503368	BTS-6800	
R79	68KΩ	½	503368	BTS-68K	
R80	18KΩ	½	503318	BTS-18K	
R81	270KΩ	½	503427	BTS-270K	
R82	2.2Meg	½	503522	BTS-2.2Meg	
R83	39KΩ	½	503339	BTS-39K	
R84	1.2Meg	½	503512	BTS-1.2Meg	
R85	47KΩ	½	503347	BTS-47K	
R86	3300Ω 5%	½	50733	BTS-3300 5%	
R87	4700Ω	½	503247	BTS-4700	
R88	22KΩ	½	503322	BTS-22K	
R89	18KΩ	½	503318	BTS-18K	
R90	18KΩ	½	503318	BTS-18K	
R91	470KΩ	½	503447	BTS-470K	
R92	22KΩ	½	503322	BTS-22K	
R93	33KΩ 5%	½	502333	BTS-33K 5%	
R94	18KΩ 5%	½	502318	BTS-18K 5%	
R95	390KΩ	½	503439	BTS-390K	
R96	8200Ω	½	503282	BTS-8200	
R97	470KΩ	½	503447	BTS-470K	
R98	470KΩ	½	503447	BTS-470K	
R99	22KΩ	½	503322	BTS-22K	
R100	3900Ω	½	503233	BTS-3900	
R101	15KΩ	½	503315	BTS-15K	
R102	22KΩ	½	503322	BTS-22K	
R103	68KΩ	½	503368	BTS-68K	
R104	150KΩ	½	503415	BTS-150K	
R105	330KΩ	½	503433	BTS-330K	
R106	820KΩ	½	503482	BTS-820K	
R107	330KΩ	½	503433	BTS-330K	
R108	82KΩ	½	503382	BTS-82K	
R109	3900Ω	½	503239	BTS-3900	
R110	150KΩ	½	503415	BTS-150K	
R111	1.8Meg 5%	1	512518	BTA-1.8Meg 5%	
R112	18KΩ	½	503318	BTS-18K	
R113	820KΩ	½	503482	BTS-820K	
R114	47KΩ 5%	½	512347	BTA-47K 5%	
R115	47Ω	½	503047	BTS-47	
R116	1Meg	½	503510	BTS-1Meg	
R117	2.2Meg	½	503522	BTS-2.2Meg	
R118	180Ω	2	76639	BTB-180	
R119	6800Ω	2	523268	BTB-6800	
R120	56KΩ	½	503256	BTS-56K	
R121	270KΩ	½	503427	BTS-270K	
R122	.82Ω	3	76582		
R123	1000Ω	½	503210	BTS-1000	
R124	560Ω	1	513156	BTS-560	
R125	560Ω	1	513156	BTS-560	
R126	100KΩ	½	503410	BTS-100K	
R127	820KΩ	½		BTS-820K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC @1.88A	550VCT @.280ADC	5VAC @5A	6.3VAC @9.5A	78200	P-8167 ①		P9738 ②	R-51BC ①	

① Parallel 6.3V windings and use as Sec. 3.
② Drill new mounting holes.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No	RATING DC RESISTANCE PRI.	RATING SEC.	REPLACEMENT DATA RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	398.5Ω tap ⑤ 3Ω, 18Ω, 18.5Ω, 28.5Ω	0Ω	78201	A-8133 ① ③	HVO-8①	FB41D ① ⑤	D-18① ⑥		Horiz. Output Trans.
T3	490Ω tap ⑤ 316Ω		78202	A-8113 ⑤ ⑧	A-3036 ⑥	Z1802 ⑥	A-99X ⑥		Vert. Output Trans.
T4A	24Ω		76616 ⑦	Dy-9A ⑧	MDF-72 ⑧	DF602 ⑧	Y-17 ⑧		Horiz. Deflection Coils
B	46Ω								Vert. Deflection Coils
T5	21Ω		76442	WC-5 ⑩	MWC-6 ⑩		WC-12 ⑩		Horiz. Lin. Coil
T6	9Ω		78205	⑪	MWC-6 ⑩		WC-12 ⑩		Width Coil

① Drill new mounting holes.
② Connect original terminal #5 to new terminal #7, original #4 to new #4, original #3 to new "T", original #2 to new #3, original #1 to new #1.
③ See instruction sheet packed with unit for terminal connections.
④ Connect terminal #7 to terminal #9, then connect original terminal #5 to new terminal #9, original #4 to new #7 and #8, original #3 to new #5, original #2 to new #3, original #1 to new #1.
⑤ Drill one new mounting hole.
⑥ Connect as auto trans.
⑦ Complete with 6 contact male connector part #75542.
⑧ Use original horiz. deflection coil network if necessary.
⑨ Enlarge mounting hole.
⑩ Connect to coded orange and black terminals.
⑪ Connect to coded red and blue terminals.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No	NOTES
T7	6.5K Ω	3.5Ω	380Ω	44Ω	76997	A-3878 ①	A-3020	Z1001 ①	S-5X ①	

① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP	REPLACEMENT DATA RCA Victor PART No	VIKING PART No	QUAM PART No	NOTES
SP1A	8"	PM	3.5Ω	75022 ①	8J9	8A2I	① Used in models 21T363, and 21T363U
B	10"	PM	3.5Ω	77777 ③	10J11	10A2I	② Used in models 21T364, 21T364U, 21T365,
C	12"	PM	3.5Ω	78093 ④	12J11	12A2I	21T365U, 21T372, 21T372U, 21T374, and 21T374U
							③ Used in Models 21T375, 21T375U, 21T375, 21T375U

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA RCA Victor PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	Ant. Trans.	.6Ω	.0Ω	73591				Secondary - Note 1
L2	Ant. Trans.	.6Ω	.0Ω	73591				
L3	IF Trap	0Ω		78543				Includes core
L4	Ant. Shunt Coil	0Ω		78538				Includes core
L5	Ant. Shunt Coil	0Ω		78537				Includes core
L6	IF Trap	0Ω		78541				Includes core
L7	FM Trap	0Ω		78540				Includes core
L8	Ant. Coils	0Ω		78398				Includes stator complete with rotor & coils
L9	Ant. Coil	0Ω		77859				
L10	Ant. Coil	0Ω		78401				Channel 6
L11	IF Input Coil	.1Ω		78271				Includes core
L12	IF Trap	.2Ω		78466				
L13	FIL. Choke	0Ω		77206				
L14	Neutr. Coil	0Ω		76582				
L15	RF Coil	0Ω		77921				Channel 13, less core core part #77914
L16	RF Coils	0Ω		78274				Includes stator complete with rotor, coils L15, L17, R15, R16, C17, C18 .47 Microhenry
L17	RF Coil	0Ω		78234				
L18	Mixer Grid Coil	0Ω		77919				
L19	Mixer Grid Coils	0Ω		78272				Includes stator complete with rotor, coils, L18, C19, C21, C25, R17, R18, R19 & R20
L20	Osc. Coil	0Ω		77915				Channel 13, less core, core part #77914
L21	Osc. Coils	0Ω		77911				Includes stator complete with rotor, coils, L20, C33
L22	FIL. Choke	0Ω		76763				
L23	FIL. Choke	0Ω		76763				
L24	Conv. Plate	.3Ω	.1Ω	78396			6315	Includes 27KΩ resistor
L25	47.25MC Trap	.1Ω		78204	17-4523 ●		6319 ●	
L26	1st. Video IF	.2Ω	.2Ω	78205	17-4523		6219	
L27	FIL. Choke	0Ω		73477	19-3001	TV-189	4604	1.36 Microhenries
L28	2nd. Video IF	.3Ω	.3Ω	78433	17-4523		6319	
L29	FIL. Choke	0Ω		73477	19-3001	TV-189	4604	1.36 Microhenries
L30	3rd. Video IF	.3Ω	.3Ω	78433	17-4523		6219	
L31	FIL. Choke	0Ω		73477	19-3001	TV-189	4604	1.36 Microhenries
L32	4th. Video IF	.3Ω	.3Ω	78433	17-4533		6319	
L33	Series Peaking Coil	4.8Ω		75253	19-3125		6153	120 Microhenries
L34	Shunt Peaking Coil	1.5Ω		71536	19-3250	TV-185	6181	250 Microhenries
L35	4.5MC Trap	2.2Ω		76983	20-1004	TV-181	1670	RCA part no. includes C53
L36	Series Peaking Coil	7.5Ω		77974	19-3250 ▲	TV-185 ▲	6181 ▲	250 Microhenries, wound on 27KΩ resistor
L37	Shunt Peaking Coil	1Ω		78322	19-3250	TV-185	6181	250 Microhenries, wound on 6.8KΩ resistor
L38	Shunt Peaking Coil	1Ω		78252	19-3500 †	TV-188 †	6174 †	500 Microhenries
L39	Series Peaking Coil	.7Ω		71529	19-3125 ■	TV-182	6178	120 Microhenries, wound on 22KΩ resistor Includes 22MMF cap. & 120KΩ resistor
L40	Sound IF	1.3Ω		76981	17-1071			
L41	Ratio Det.	10Ω	.10CT.	77113	19-1033	TV-110	1468	Tertiary winding - .2Ω
L42	Horiz. Osc.	80Ω		76440	20-1402	TV-162	6183	Pri. tapped @ 55Ω Horiz. waveform winding-48Ω
L43	RF Choke	.72Ω		76640			4604	1.5 Microhenries, IRC part #CL-1

† Parallel with 6.8KΩ resistor
▲ Parallel with 27KΩ resistor
■ Parallel with 22KΩ resistor
* Use one winding only

Note 1. Complete trans. assembly. (part #78396 - includes L1 & L2)

RCA VICTOR MODELS 21-T-356U, 21-T-363, U, 21-T-364, U, 21-T-365, U, 21-T-372, U, 21-T-373, U, 21-T-374, U, 21-T-375, U (Ch. KCS83, B, E)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
L44	.280A	41Ω	1.06HY	77676	C-2326 ①	C-2996 ①	C5037 ①	C-17X①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RCA Victor PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/10A 250V	78214	78218	312.300 (3AG-3/10A)	357001	AGC 3/10	4405

CRYSTAL DIODES

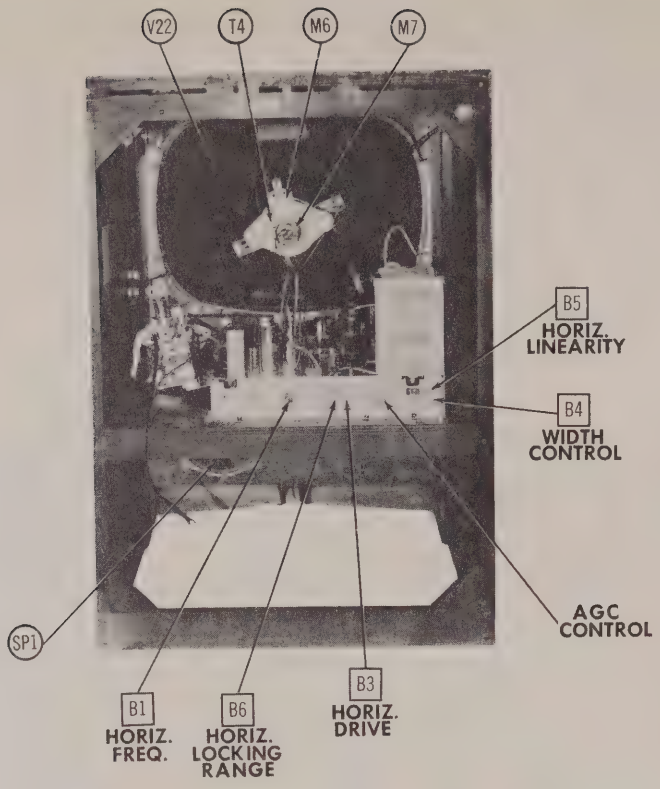
ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		RCA Victor PART No.	SYLVANIA PART No.		
M2	1N82	77489	1N82, A		UHF mixer - KRK12A tuner

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M3	Dial Light	11765	#51 Bayonet - Channel Indicator
M4A	Tuner	KRK29	VHF - used on Ch. KCS83 - Models 21T363 to 21T375 Incl.
B	Tuner	KRK12A	VHF-UHF - used on Ch. KCS83B & E - Models 21T356U to 21T375U incl.
M5	Switch	78211	TV-phono tone control
M6	Focus Magnet	76168	Includes centering device
M7	Ion Trap	76141	
M8	Correction Magnet	76633	Used with 21EP4 kinescope (2)
A16	Trimmer Cap.	78397	80-150MMF-KRK29 tuner IF trap
A14	Trimmer Cap.	77616	4-40MMF-KRK12A tuner IF trap
A11	Trimmer Cap.	78220	5-70MMF-42.5MC response
B3,B6	Trimmer Cap.	75217	Dual 10-160MMF horiz. drive & horiz. locking range
	Knob	77699	Brightness-brown
	Knob	77719	Brightness - Med. beige
	Knob	77738	Brightness - Tan
	Knob	77968	Channel Selector - brown - KRK12A tuner
	Knob	77969	Channel Selector - med. beige - KRK12A tuner
	Knob	77970	Channel Selector - tan - KRK12A tuner
	Knob	77708	Channel Selector - KRK29 tuner
	Knob	77750	Fine tuning - KRK12A tuner
	Knob	77707	Fine tuning - KRK29 tuner - brown
	Knob	77717	Fine tuning - KRK29 tuner - med. beige
	Knob	77733	Fine tuning - KRK29 tuner -tan
	Knob	77735	TV-phono tone - brown
	Knob	77737	TV-phono - tan
	Knob	77709	Picture control - brown
	Knob	77718	Picture control - med brown
	Knob	77734	Picture control - tan
	Knob	77710	Off/on/volume
	Markers	77766	UHF channel markers KRK12A tuner - blonde or oak cab
	Markers	77765	UHF channel markers KRK12A tuner - Mahogany or red cherry cabinet
	Markers	77767	UHF Channel markers KRK12A tuner - Maple cabinet
	Markers	77763	VHF channel markers KRK12A tuner - blonde or oak cab.
	Markers	77762	VHF channel markers KRK12A tuner - Mahogany or red cherry cabinets.
	Marker	77764	VHF channel markers KRK12A tuner - Maple
	Mask	78316	Channel marker escutcheon - brown - KRK29
	Mask	78317	Channel marker escutcheon - med. beige KRK29
	Mask	78318	Channel marker escutcheon - tan -KRK29
	Mask	78311	Polystyrene masking panel - gray & red
	Mask	78312	Polystyrene masking panel - pink & light taupe
	Disc	77758	Polystyrene indicator - brown - KRK12A
	Disc	77757	Polystyrene indicator - sand gray - KRK12A
	Disc	77756	Polystyrene indicator -maroon - KRK12A
	Escutcheon	78315	Channel marker - KRK29
	Safety Glass	78314	Wood console cabinets
	Safety Glass	78329	Metal table cabinets

PROPERTY OF
ANKENSHIP
MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If the picture cannot be synchronized horizontally with the horizontal hold control, adjust the horizontal frequency slug (B1) until the picture will synchronize. If picture still will not synchronize, adjust the horizontal waveform slug (B2) several turns out of the coil and readjust B1 to synchronize the picture. If picture width or linearity is incorrect adjust the horizontal drive trimmer (B3), the width control slug (B4) and the horizontal linearity slug (B5) for proper results.

HORIZONTAL WAVEFORM ADJUSTMENT

The horizontal waveform adjustment is made at the factory and normally will require no readjustment. B1 and B2 are adjusted simultaneously while watching the picture.

Set the horizontal hold control fully clockwise.

Turn B1 until the picture falls out of sync and 3 or 4 diagonal black bars sloping down to the right appear on the screen. Turn B2 clockwise, at the same time adjusting B1 to maintain 3 or 4 bars on the screen. Continue adjusting B1 and B2 in that manner until the oscillator begins to motorboat, then adjust B2 counter clockwise until the motorboating stops. To check adjustment turn B1 until picture synchronizes, then reverse the direction until picture falls out of sync with diagonal bars sloping down to the right.

Continue to turn B1 in the same direction. No more than 3 or 4 bars should appear on the screen. Instead the horizontal oscillator should start to motorboat. Retouch B2 until this condition is obtained.

To observe the horizontal waveform connect the low capacity probe of an oscilloscope to terminal "C" of L42. Turn the horizontal hold control 1/4 turn from the clockwise postition so that picture is in sync.

The waveform on the scope should appear as in Fig. 9. Adjust B2 for broad and narrow peaks of equal height as in Fig. 9. If necessary, while adjusting B2 keep the picture is sync with the horizontal hold control.

HORIZONTAL LOCKING RANGE ADJUSTMENT

With the horizontal hold control in full counter clockwise position momentairly interrupt the signal by switching off channel and back again.

If picture remains in sync turn B1 slightly and again switch off channel repeating until picture loses sync with diagonal bars sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of bars obtained just before the picture pulls into sync. If the number is more than 3 adjust the horizontal locking trimmer (B6) slightly clockwise. If the number is less than 2 adjust B6 counter clockwise. Recheck as above for the least number of bars and readjust B6, if necessary, until 2 or 3 bars are present.

Turn the horizontal hold control fully clockwise and adjust B1 until the diagonal bar sloping down to the right appears on the screen, then reverse direction of adjustment of B1 until the diagonal bar just disappear, leaving the picture in synchronization.

AGC CONTROL ADJUSTMENT

Connect vertical amplifier of oscilloscope to pin 9 (plate) of 6X8 (V7A). Low side to chassis.

Turn the AGC control fully counter clockwise.

Tune in a strong TV signal and view the video waveform on the scope.

Turn the AGC control clockwise until a compression of the sync tips is noted, then counter clockwise to a point where no compression is obtained.

FM TRAP ADJUSTMENT

If interference from a strong FM station is encountered adjust A40 (on top of antenna matching transformer) for minimum interference in the pattern. In some sets A40 will tune down to channel 6 or even 5. In areas where channels 5 or 6 are to be received check A40 to make sure it does not affect the sensitivity on these two channels.

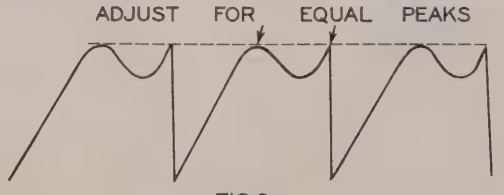


FIG. 9

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
F. BLANKENSHIP
3312 MEADE ST
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V20 and V21. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PIX

Substitute V20 and V21. Check B+ filter and decoupling components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V16, V17, V18 and V19. Check waveform W16.

If Satisfactory	If Unsatisfactoey
Check T2, T4A, C120, R122, R119, R118 and other associated circuit components.	Check C108, C109, C112, C113, L42, R111, R114, R116 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V19, V20 and V21. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V16, V17, V18 and V19. Check R122, C120, T2, T4A R119, C114 and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss of Video".

RASTER NO SOUND NO PIX

Check by substitution V1, V2, V3, V4, V5 and V6. Check associated circuit components.

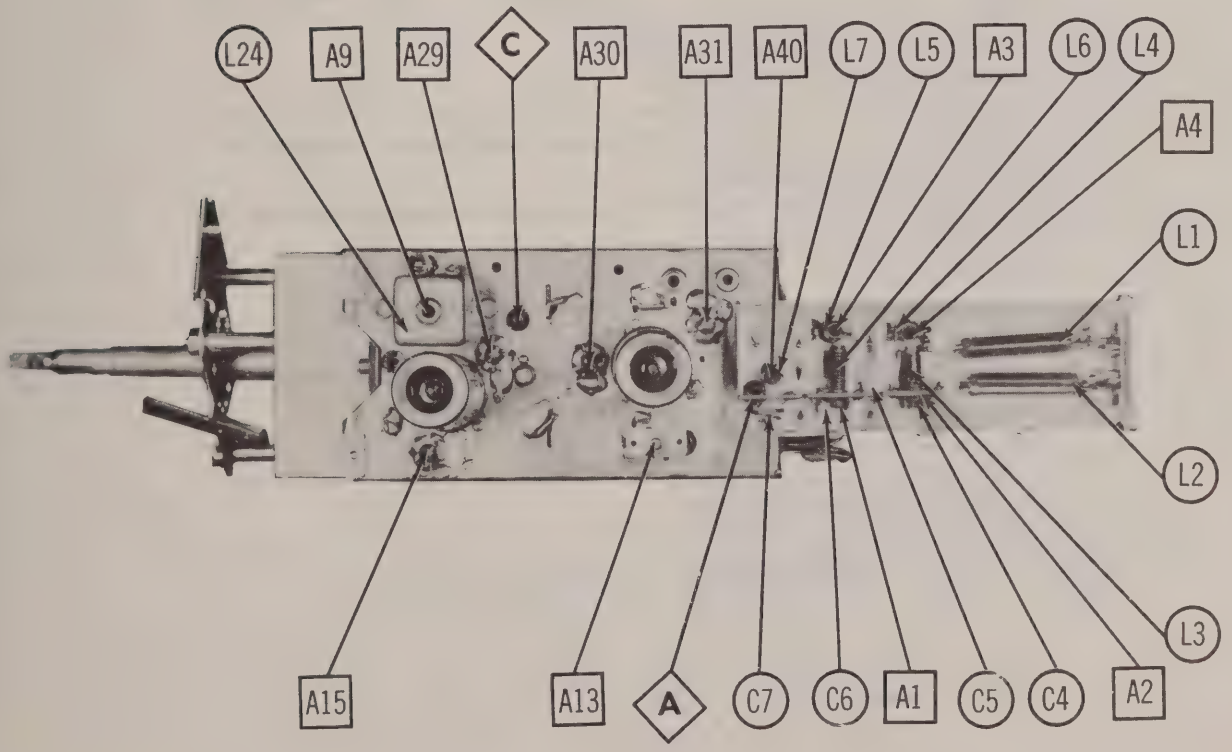
NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check video signal at W3 for interference pulses. Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



RF TUNER TOP VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

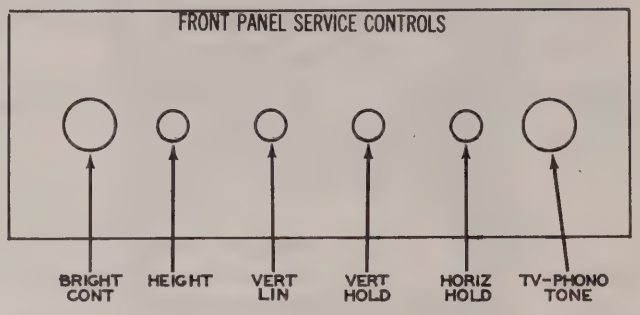
PICTURE TUBE SAFETY GLASS CLEANING

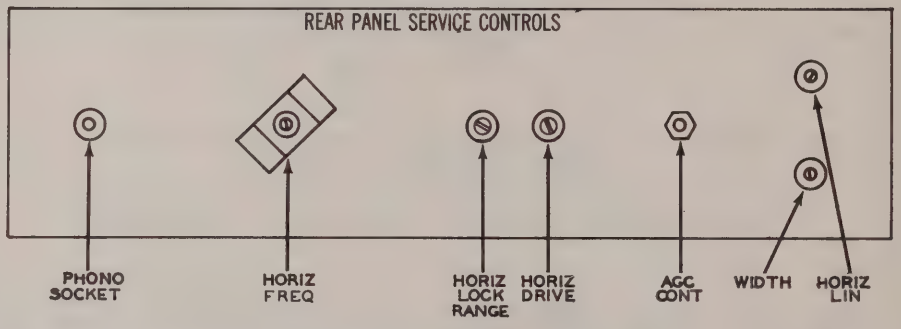
Remove 8 metal retainers from inside front of cabinet. Hold safety glass while removing metal frame. Remove safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Freq. slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary L41 located on bottom of chassis. (See tube placement chart). (Hole in bottom of cabinet to adjust secondary).

FUSES

One fuse is used for Horiz. Sweep Circuit protection. (For location, see tube placement chart).

CENTERING

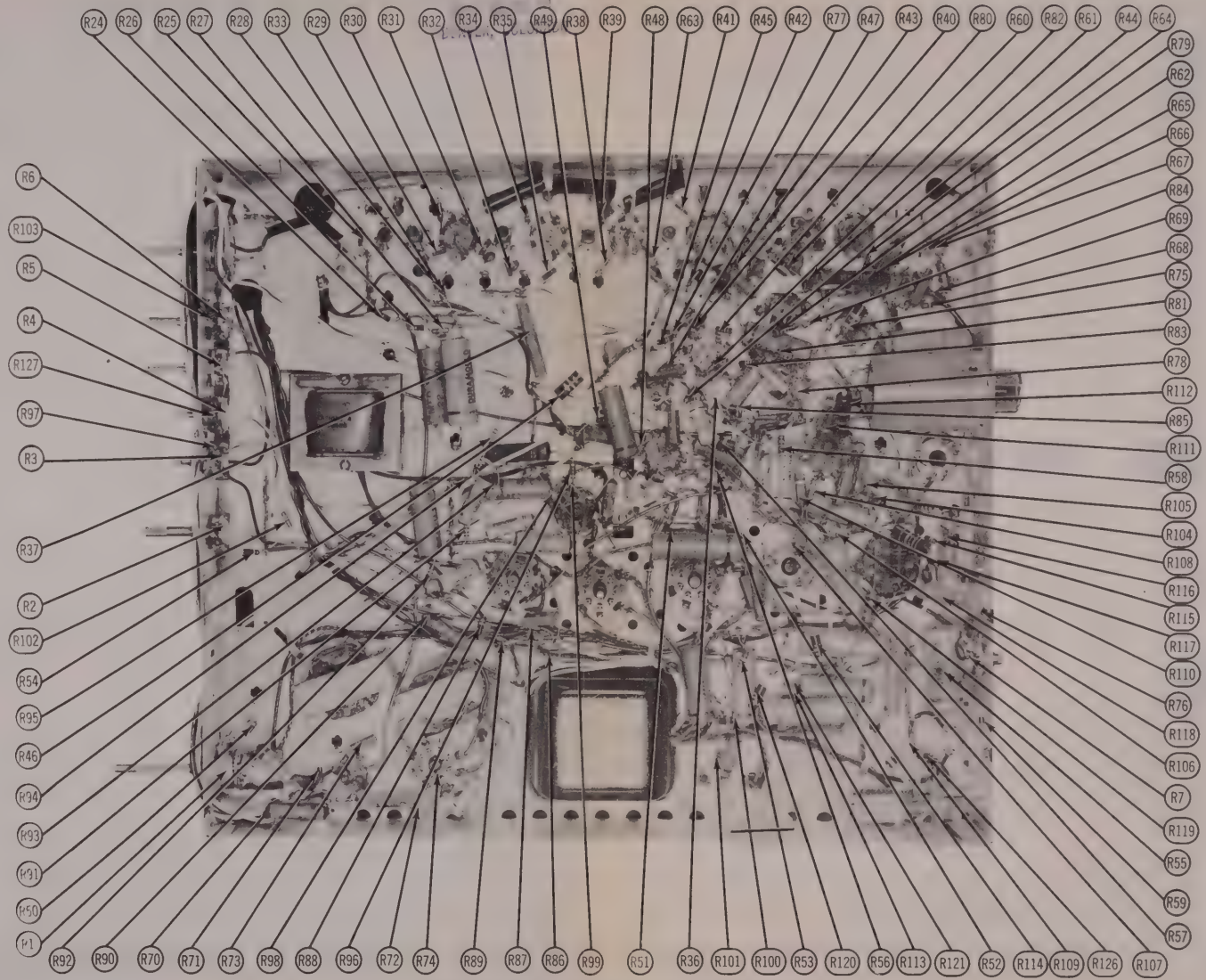
Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

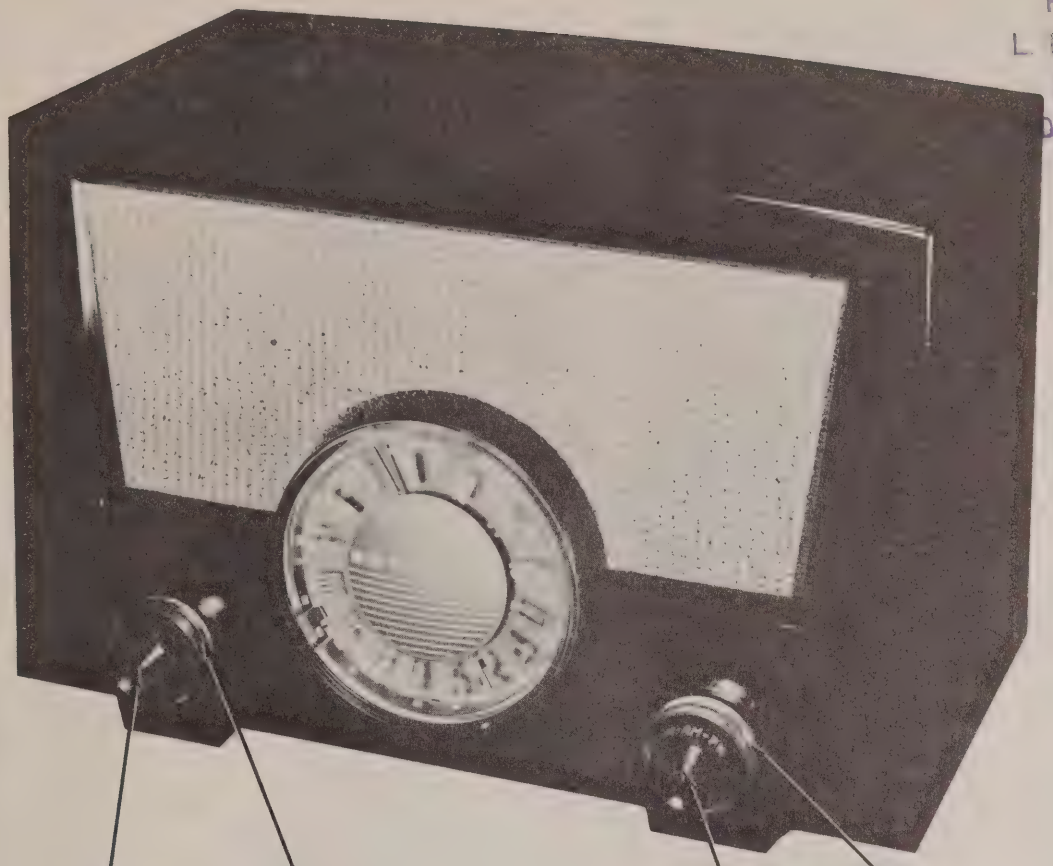
1. Remove 6 push on type control from front panel.
2. Disconnect built-in antenna and transmission line from rear panel.
3. Remove 2 wood screws and 2 clamps.
4. Disconnect speaker plug, yoke plug, CRT socket, HV lead and yoke ground strap.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

RAYTHEON
MODELS FR81A, FR82A (Ch. 9AF25A)

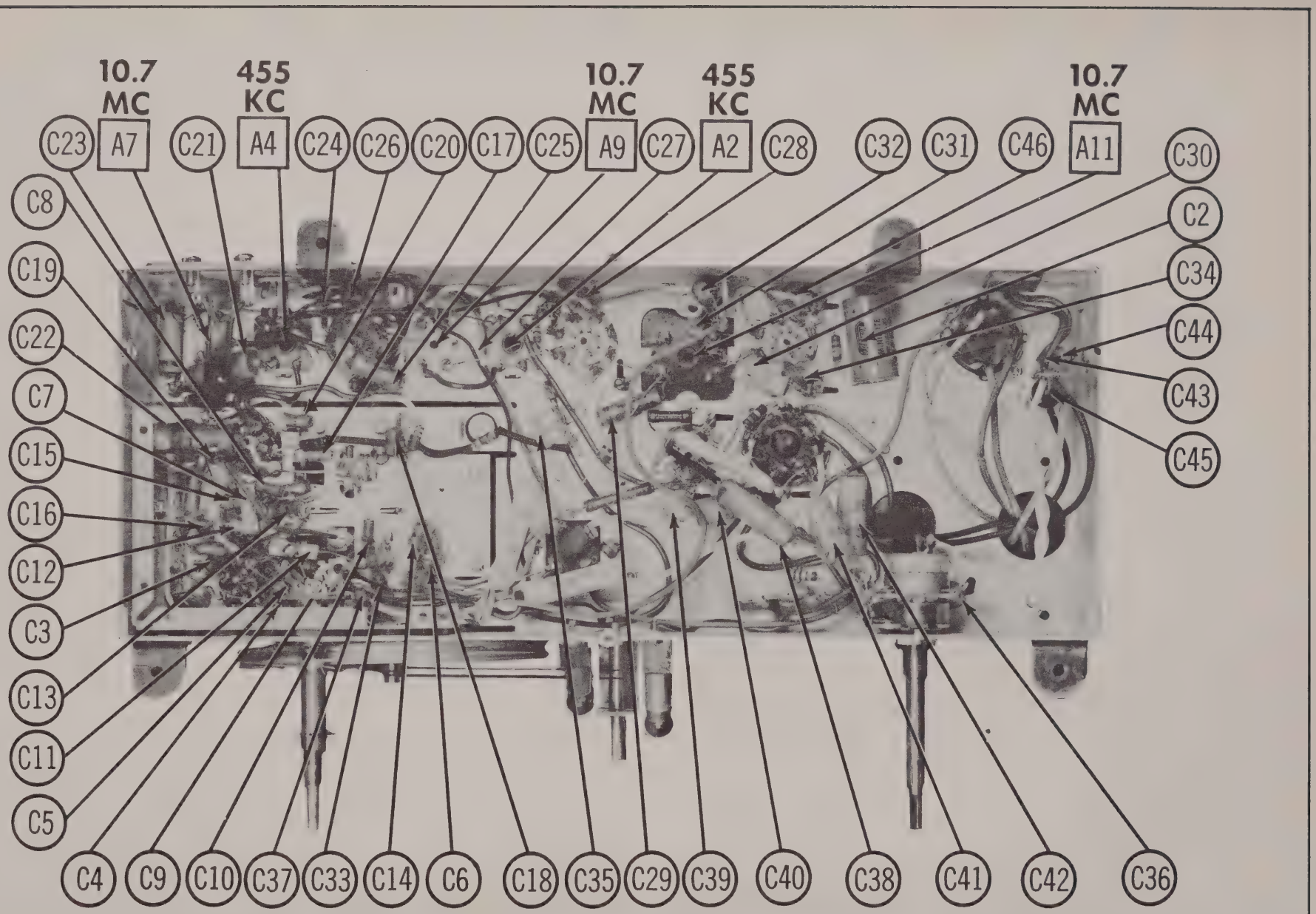


RAYTHEON
MODELS FR81A, FR82A (Ch. 9AF25A)

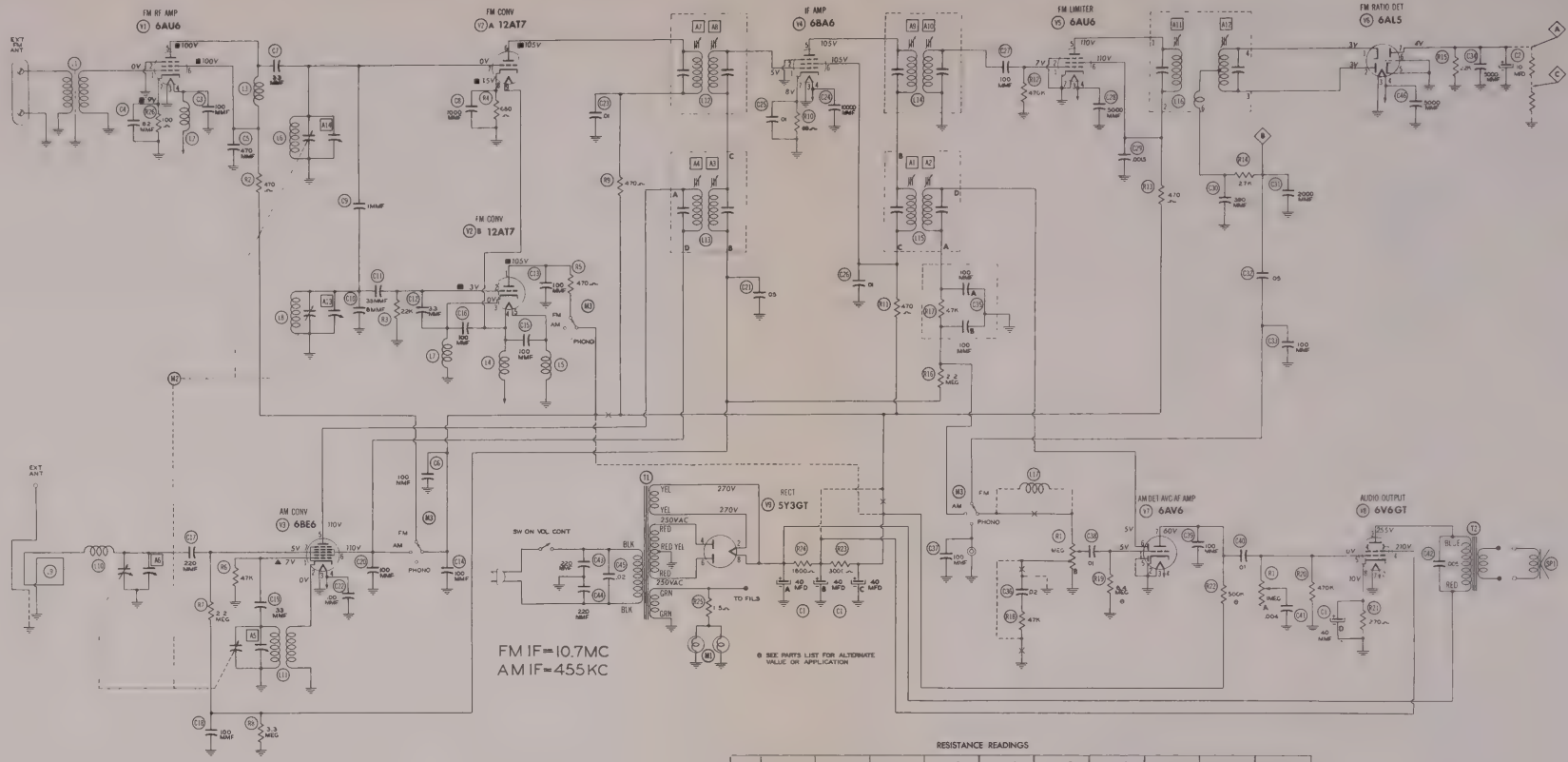
TRADE NAME	Raytheon Models FR81A, FR82A (Ch. 9AF25A)	
MANUFACTURER	Raytheon Mfg. Co., TV & Radio Div., 5921 Dickens Ave., Chicago 39, Ill.	
TYPE SET	AC Operated AM-FM Superheterodyne Receiver	
TUBES (Nine)	Types 6AU6 RF Amp., 12AT7 FM Conv., 6BE6 AM Conv., 6BA6 IF Amp., 6AU6 FM Limiter, 6AL5 FM Det., 6AV6 AM Det.-AVC-AF Amp., 6V6GT Audio Output, 5Y3GT Rectifier	
POWER SUPPLY	115 Volts AC -60 Cycles	RATING .54 Amp. @ 117 Volts AC
TUNING - BROADCAST	540-1600KC	FREQ.MOD. 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	.1Ω	0Ω	0Ω	.1Ω	†■5.3KΩ	†■5.3KΩ	100Ω		
V 2	12AT7	†■5.3KΩ	22KΩ	.1Ω	.1Ω	.1Ω	†5.3KΩ	.1Ω	680Ω	0Ω
V 3	6BE6	47KΩ	.1Ω	0Ω	.1Ω	†4.8KΩ	†4.8KΩ	4.2Meg		
V 4	6BA6	1.8Meg	0Ω	0Ω	.1Ω	†4.8KΩ	†4.8KΩ	68Ω		
V 5	6AU6	470KΩ	0Ω	0Ω	.1Ω	†4.8KΩ	†4.8KΩ	0Ω		
V 6	6AL5	INF	INF	0Ω	.1Ω	0Ω	INF	22KΩ		
V 7	6AV6	6.8Meg	0Ω	0Ω	.1Ω	0Ω	900KΩ	†500KΩ		
V 8	6V6GT	INF	.1Ω	†450Ω	†1.8KΩ	470KΩ	.1Ω	0Ω	270Ω	
V 9	5Y3GT	INF	100KΩ	INF	140Ω	INF	130Ω	INF	100KΩ	

■ MEASURED IN FM POSITION
† MEASURED FROM PIN 8 OF V9
ALL MEASUREMENTS TAKEN IN "AM" POSITION UNLESS OTHERWISE NOTED

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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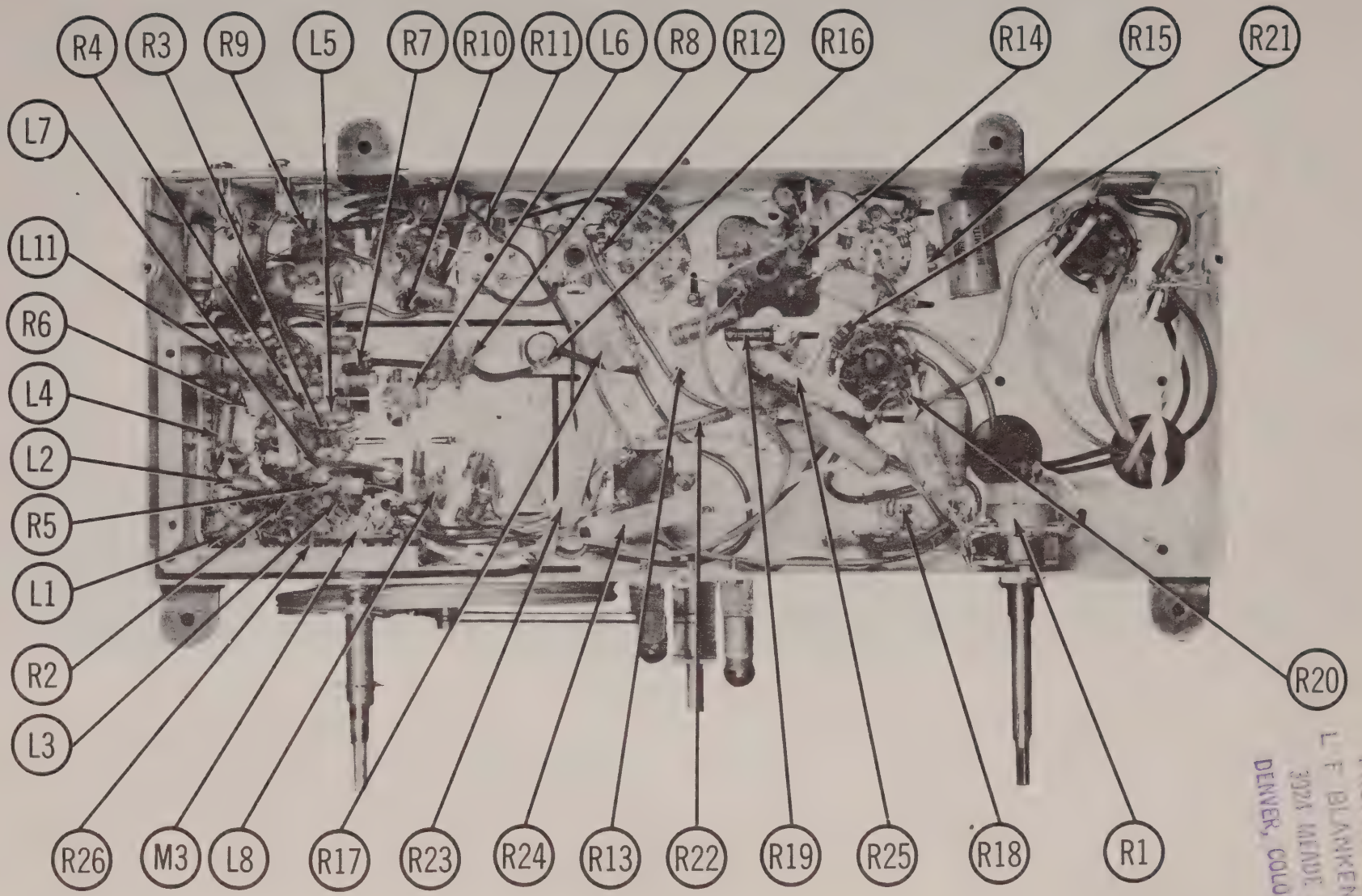


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSI
3020 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set tone control fully clockwise.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC. (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection. Set pointer to last calibration mark at high frequency end of dial.
2.		Loop	1620KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune to 1400KC signal	"	A6	"
4.	Check calibration at 600, 1000 and 1500KC. If necessary, repeat steps 2 and 3.							

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓐ to B-. The junction of these two resistor is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A9, A10 All	Adjust for maximum deflection. Attenuate signal generator to maintain 3 volts at VTVM.
6.	"	High side to FM oscillator stator lug on tuning gang. Low side to chassis.	"	"	"	"	A7, A8	"
7.	"	"	"	"	"	DC probe to point Ⓑ. Common to point C.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC	FM	Point of non-interference	Vert. amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A9, A10 All	Disconnect stabilizer capacitor C2. Adjust for curve of maximum amplitude and symmetry as in Fig. 1.
6.	"	High side to FM oscillator stator lug on tuning gang. Low side to chassis.	"	"	"	"	A7, A8	"
7.	"	"	"	"	"	Vert. amp thru 10KΩ to point Ⓑ. Low side to chassis.	A12	Reconnect stabilizer capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch All for maximum amplitude and straightness of crossover lines.

FM RF AND MIXER ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	300Ω carbon resistor	High side thru 300Ω to ungrounded FM antenna terminal. (Left hand screw). Low side to chassis.	108MC (Unmod)	FM	108MC	DC probe to point Ⓐ. Common to chassis.	A13	Adjust for maximum deflection.
9.	"	"	98MC	"	98MC	"	A14	"

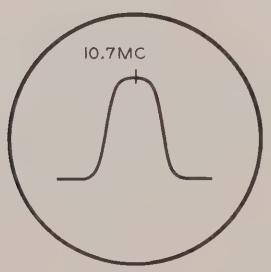


FIG. 1

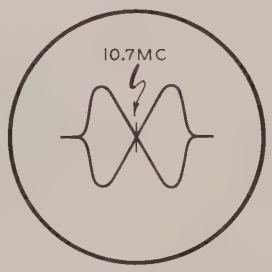


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM AF Amplifier	6AU6	6AU6	7BK	
V2	FM Converter	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	IF Amplifier	6AB6	6BA6	7BK	
V5	FM Limiter	6AU6	6AU6	7BK	
V6	FM Ratio Det.	6AL5	6AL5	6BT	
V7	AM Det.-AVC-AF Amp.	6AV6	6AV6	7BT	
V8	Audio Output	6V6GT	6V6GT	7S	
V9	Rectifier	5Y3GT	5Y3GT	5T	

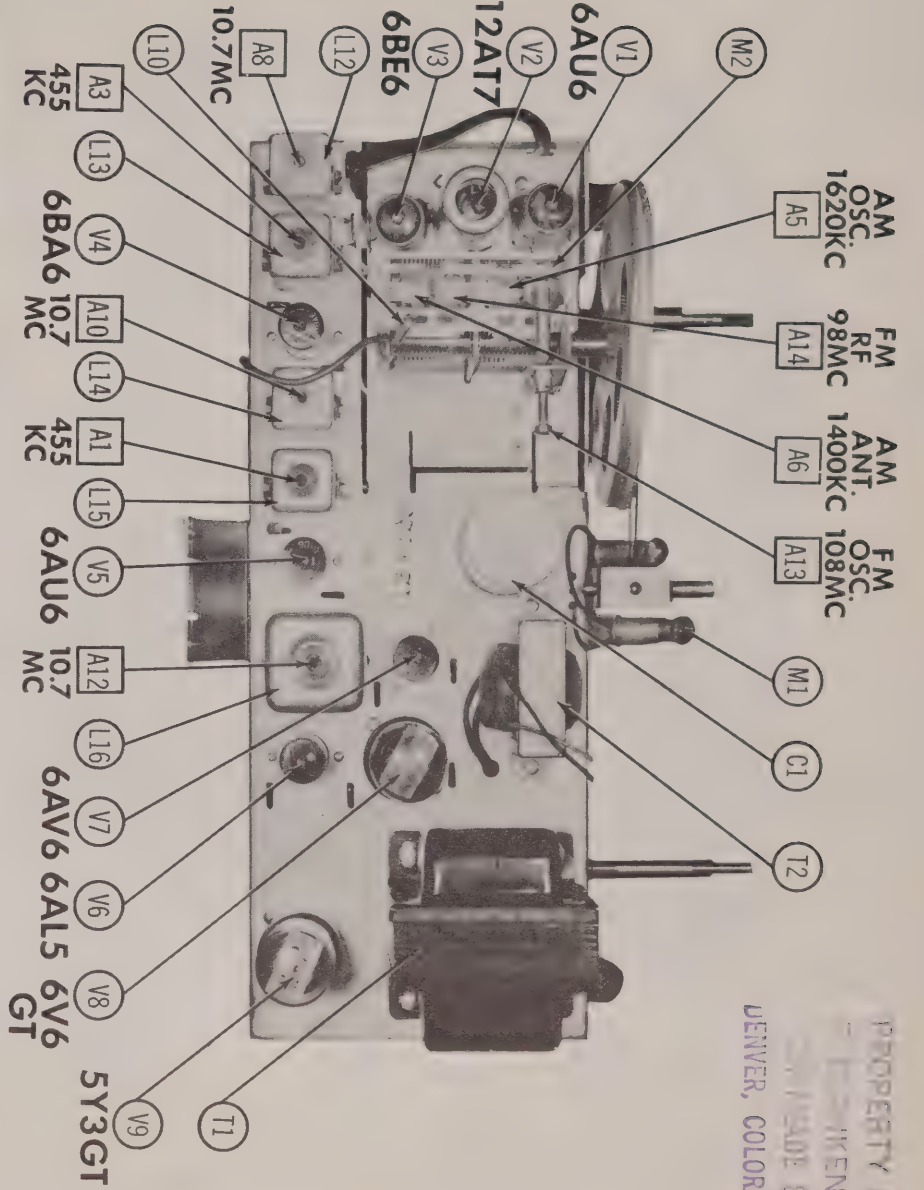
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	350	8C18125	AFH4-53		DO46		FP430.6	[TVL-3787	
B	■40	350							[TVA-1206	
C	▲40	350								
D	40	25								
C2	10	50	8C-18128	PRS50/10		BR105		TC32	TVA-1304	
C3	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C4	82		8G-19941	SI82	D6-820		GP1K-820		5GA-Q82	
C5	470		8G-20492	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C6	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C7	33		8G-14172	SI33NP0	TCZ-33		NP0L-330	ZT-5433	5TCC-Q33	
C8	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5GA-D1	
C9	1		8G-12495-2		TCZ-1					
C10	8		8G-16049							
C11	33		8G-14172	SI33NP0	TCZ-33		NP0L-330	ZT-5433	5TCC-Q33	
C12	3.3		8G-12495-5	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533		
C13	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C14	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C15	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C16	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C17	220		8G-14459	SI221	D6-221		GP2K-221	UC-5322	5GA-T22	
C18	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C19	33		8G-14172	SI33NP0	TCZ-33		NP0L-330	ZT-5433	5TCC-Q33	
C20	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C21	.05	400	8D-10770	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C22	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C23	.01	400	8D-17270	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C24	10000		8G-16019	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C25	.01	200	8D-17258	P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C26	.01	400	8D-17270	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C27	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C28	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5GA-D5	
C29	.0015	600	8D-19565	P688-0015	D6-152	PTE6D15	GP2L-152	PT6215	6TM-D15	
C30	390	500	8F3-120	1468-0004		5W5T4		MC243	1FM-34	
C31	2000		8G-16049	SI2000	D6-202	TM5D2	GP2-333-202	UC-522	5HK-D2	
C32	.05	200	8D-14460	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C33	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C34	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35A	100		*201-15005	*PA97	*PC-50		*1403-01		*100C1	
B	100									
C36	.02	200	8D-11304	P288-02	DF-203	PJ2S2		PT412	2TM-S2	
C37	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C38	.01	200	8D-11738	P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C39	100		8G-19862	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C40	.01	400	8D-10761	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C41	.004	600	8D-10788	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C42	.005	600	8D-10935	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C43	220			SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C44	220			SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C45	.02	600	8J-11321	P688-02		PTE6S2		PT612	6TM-S2	
C46	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	

* Items C35A, C35B and R17 are combined in one unit.

CHASSIS—TOP VIEW



PROPERTY OF
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	A10A-18703	* QJ-508R			UF16A	Tone (Panel)
B	1Meg		Not Req.				UR16-T1253†	Volume (Rear) tapped at 100K
C	Switch		Not Req.				US-26	Attach to R1B

† Universal replacement (Mallory exact duplicate Part. No. UE1686S).
* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B13-137 & P7-206 (Panel)
B18-137X & R2-226 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R2	470Ω	½	9B1-58	BTS-470	
R3	22KΩ	½	9B1-78	BTS-22K	
R4	680Ω	½	9B1-60	BTS-680	
R5	470Ω	½	9B1-58	BTS-470	
R6	47KΩ	½	9B1-82	BTS-47K	
R7	2. 2Meg	½	9B1-33	BTS-2. 2Meg	
R8	3. 3Meg	½	9B1-34	BTS-3. 3Meg	
R9	470Ω	½	9B1-58	BTS-470	
R10	68Ω	½	9B1-48	BTS-68	
R11	470Ω	½	9B1-58	BTS-470	
R12	470KΩ	½	9B1-94	BTS-470K	
R13	470Ω	½	9B1-58	BTS-470	
R14	27KΩ	½	9B1-79	BTS-27K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R15	22KΩ	½	9B1-78	BTS-22K	
R16	2. 2Meg	½	9B1-33	BTS-2. 2Meg	
R17	47KΩ	½	* 201-15005	BTS-47K	
R18	47KΩ	½	9B1-82	BTS-47K	
R19	6. 4Meg	½			Note 1
R20	470KΩ	½	9B1-94	BTS-470K	
R21	270Ω	½	9B1-55	BTS-270	
R22	500KΩ	½			Note 2
R23	3000Ω	5	9C12-2059	B3/4A-3000	
R24	1800Ω	5	9C12-1102		
R25	1. 5Ω	5		1 3/4A-1. 5	
R26	100Ω	½	9B1-135	BTS-100	

Note 1. Some models may use a 6. 8Meg resistor in this application.
Note 2. Some models may use a 470KΩ resistor in this application.
* Items R17, C35A, C35B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T1	115VAC @.54A	510VCT .068ADC	5VAC @2A	6.3VAC @3.2A	12A18856	PC-8404 ①		P9206	R-10A①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	5.2KΩ	3.2Ω	448Ω	1.12Ω	12C-18143	A-3877①	A-3019	Z1002	S-3X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RAYTHEON PART No.	VIKING PART No.	QUAM PART No.	
SP1	5 x 7"	PM	3.2Ω	18A19896 18A18857 ①	57J9	57A1	① Alternate 5 x 7" PM speaker

PARTS LIST AND DESCRIPTIONS (Continued)

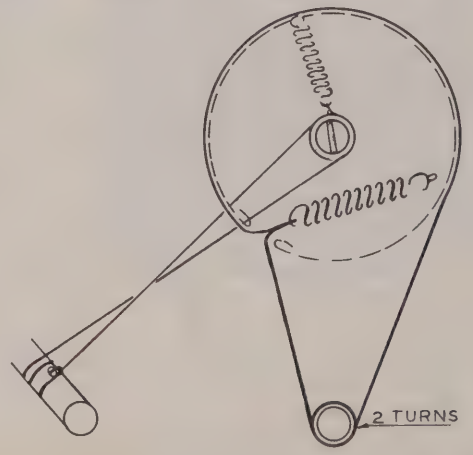
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω	201-20407				
L2	Fil. Choke	0Ω		201-20405	19-3001	TV-189	6175	. 5 Microhenry
L3	FM RF Choke	. 4Ω		201-20402			4608	4. 7 Microhenries
L4	Fil. Choke	0Ω		201-20403	19-3001	TV-189	4604	1. 3 Microhenries
L5	Fil. Choke	0Ω		201-20403	19-3001	TV-189	4604	1. 3 Microhenries
L6	FM RF Coil	0Ω		13E-20472				
L7	FM Cathode Choke	0Ω		201-20403	19-3001	TV-189	4604	1. 3 Microhenries
L8	FM Osc. Coil	0Ω		13D-16617				
L9	Am Loop Ant.	0Ω	1. 9Ω	13E-21038				
L10	Am Ant. Loading Coil	. 3Ω		201-20406			4606	2. 4 Microhenries
L11	Am Osc. Coil	. 2Ω	5Ω	13D-20462	14-1074		70-Osc.	
L12	1st FM IF	. 1Ω	1. 3Ω	13A-18567	16-6665 *	FM-251 *	1451 *	
L13	1st AM IF	12Ω	12Ω	13A-16662	16-6666 *	BC-368 *	1312-C1 *	
L14	2nd FM IF	1. 3Ω	1. 3Ω	13B-18568	16-6665 *	FM-251 *	1451 *	
L15	2nd AM IF	12Ω	12Ω	13A-16662	16-6667 *	BC-371 *	1312-64 *	
L16	Ratio Det.	2. 1Ω	. 1ΩCT	13M-19356	17-3487	FM-255 †	1465 †	Tertiary winding= .25Ω
L17	Audio Coupling			16A-18676				Not used in all models

* Drill mounting holes.
† Drill mounting holes and use adaptor plate.

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M1	Dial Light	46A-11971	(2) used #51 Bayonet
M2	Tuner	8A-20464	4 Gang (2-FM) (2-AM at 24-467MMF & 36-205MMF)
M3	Switch	20A-20479	FM-AM-phono function selector
	Cabinet	5C-18715-93	Bakelite - black
	Cabinet	5C-18715-65	Bakelite - Mahogany
	Knob	5B-21042-29	(2) tone 2 tuning - clear
	Knob	5B-21041-85	Off/On/Volume
	Knob	5B-21058-85	FM-AM-Phono
	Knob	5B-21041-74	Off/On/Volume
	Knob	5B-21058-74	FM-AM-Phono
	Dial Scale	5M-21048	



DIAL CORD STRINGING

SILVERLINE
MODELS 63A, 64 (UHF Conv.)

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DENVER, COLORADO

FUNCTION SELECTOR SWITCH

TUNING CONTROL

SILVERLINE
MODELS 63A, 64 (UHF Conv.)

TRADE NAME	Silverline Models 63A, 64
MANUFACTURER	General Instrument Corp., 829 Newark Ave., Elizabeth 3, N.J.
TYPE SET	AC Operated UHF Converter
TUBES (Two)	Types 6J6 UHF Osc., 6CB6 IF Amplifier
POWER SUPPLY	110-120 Volts AC RATING .16 Amp. @ 117 Volts AC
TUNING RANGE -	Channels 14 thru 83

THIS CONVERTER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND SHOULD NOT REQUIRE ALIGNMENT IN THE FIELD. IF THE TUNER SHOULD BECOME DEFLECTIVE OR REQUIRE ALIGNMENT THE COMPLETE UNIT SHOULD BE RETURNED TO THE FACTORY:

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Gen. Instr. PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6J6	6J6	7BF	
V2	IF Amplifier	6CB6	6CB6	7CM	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Gen. Instr. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■100	150	73-62078			XB006		FP215		
B	▲100	150								
C2	10		73-45109	SII0NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C3	4.7									
C4	4.7									
C5	4.7									
C6	.7-2				829-3			CT565A		
C7	800		73-45119	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C8	800		73-63002	EF-001	MFT-1000				503C-D1	
C9	800		73-63002	EF-001	MFT-1000				503C-D1	
C10	9		73-45138							
C11	800		73-45119	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C12	800		73-45119	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C13	800		73-45119	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C14	800		73-45119	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C15	2.2									
C16	.05	400	73-61063	489ZX-05		PJ4S5		PT415	4TM-S5	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Gen. Instr. PART No.	IRC PART No.	
R1	10KΩ	1/2		BTS-10K	
R2	470Ω	1/2		BTS-470	
R3	270Ω	1/2	74-37942	BTS-270	

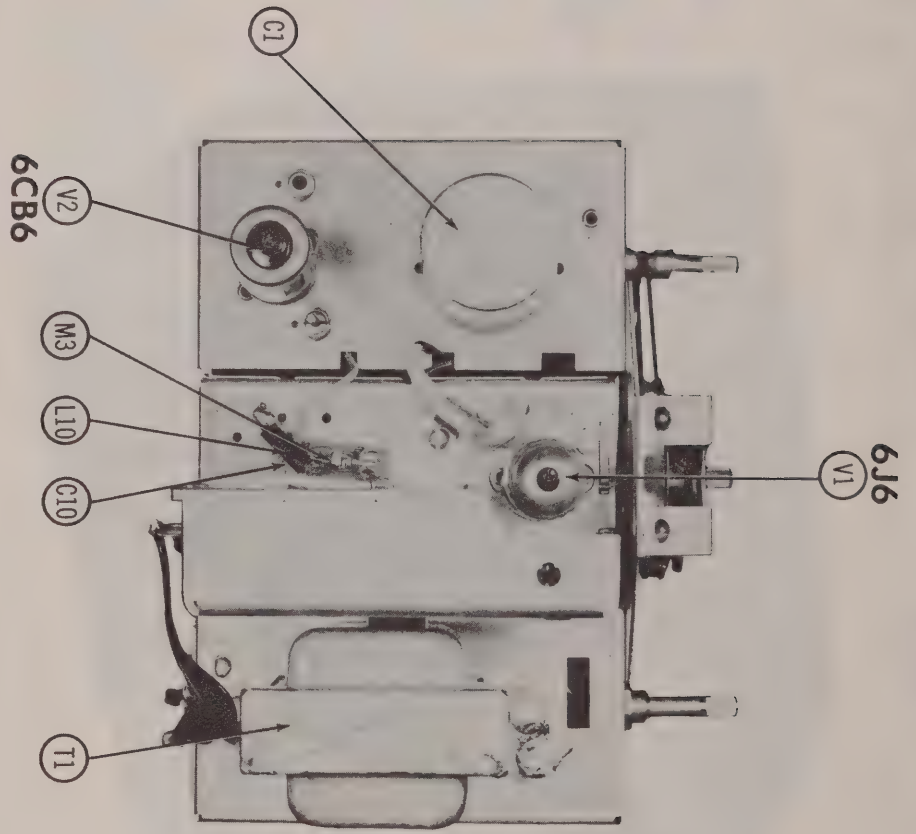
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Gen. Instr. PART No.	IRC PART No.	
R4	120Ω	1/2	74-37928	BTS-120	
R5	1200Ω	1/2	74-37970	BTS-1200	
R6	470Ω	1/2		BTA-470	
R7	150Ω	1/2		BTA-150	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	Gen. Instr. PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T1	117VAC @ .16A	132V .030ADC	6.3VAC @ .74A			PA-8421	P-3046 ①	P9102	R-30X

① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

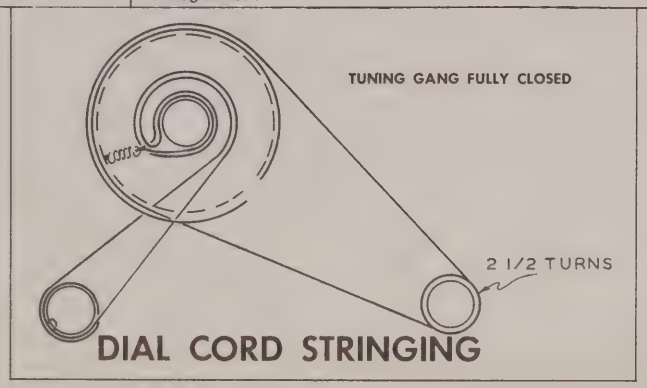
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Gen. Instr. PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. coupling loop	0Ω						
L2	Ant. coupling loop	0Ω						
L3	RF coupling	0Ω						
L4	Fil. Choke	0Ω		83A59638				
L5	Osc. tank coil	0Ω						
L6	Osc. tank shunt coil	0Ω						
L7	Osc. grid coil	0ΩCT						
L8	Harmonic osc. coupling loop	0Ω						
L9	Osc. doubler coupling	0Ω						
L10	RF Choke	.3Ω		83-60913				
L11	UHF IF Input tuning	0Ω		83A60908				
L12	Fil. Choke	0Ω		83A59638				
L13	UHF IF output tuning	.1Ω	Sec. 1 .1Ω Sec. 2 0ΩCT	83A62090				

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Gen. Instr. PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	.030A		6M1	1007A			

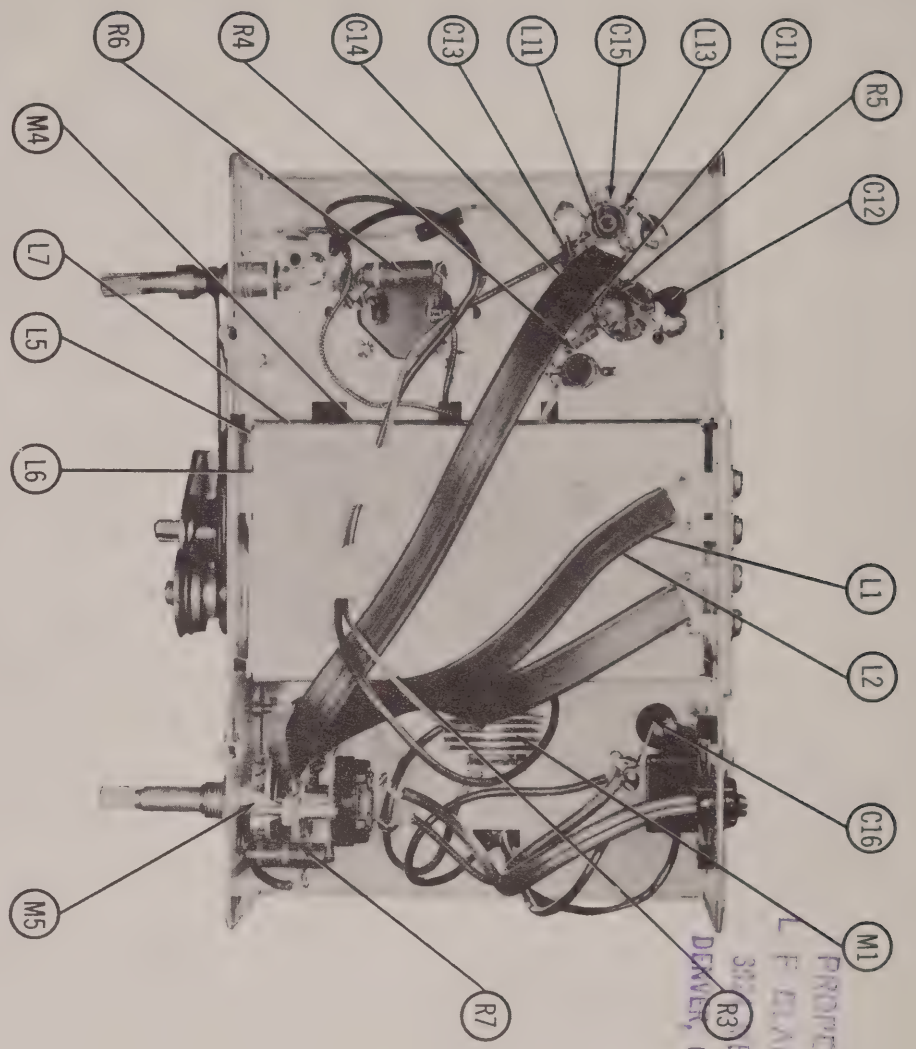
MISCELLANEOUS

ITEM No.	PART NAME	Gen. Instr. PART No.	NOTES
M2	Tuning cap	73-45119	5 gang
M3	Crystal	63-60544	1N82 mixer
M4	Crystal	63-61863	G7C harmonic
M5	Switch	58-61790	Function selector
	Trimmer cap	52-61817	.7-2MMF
	Cabinet	52-61817	Plastic model 64
	Cabinet	52-61792	Wood model 63A
	Knob	91-60861	Selector model 63A
	Knob	91-61805	Selector model 64
	Knob	91-60862	Tuning model 63A
	Knob	91-61806	Tuning model 64



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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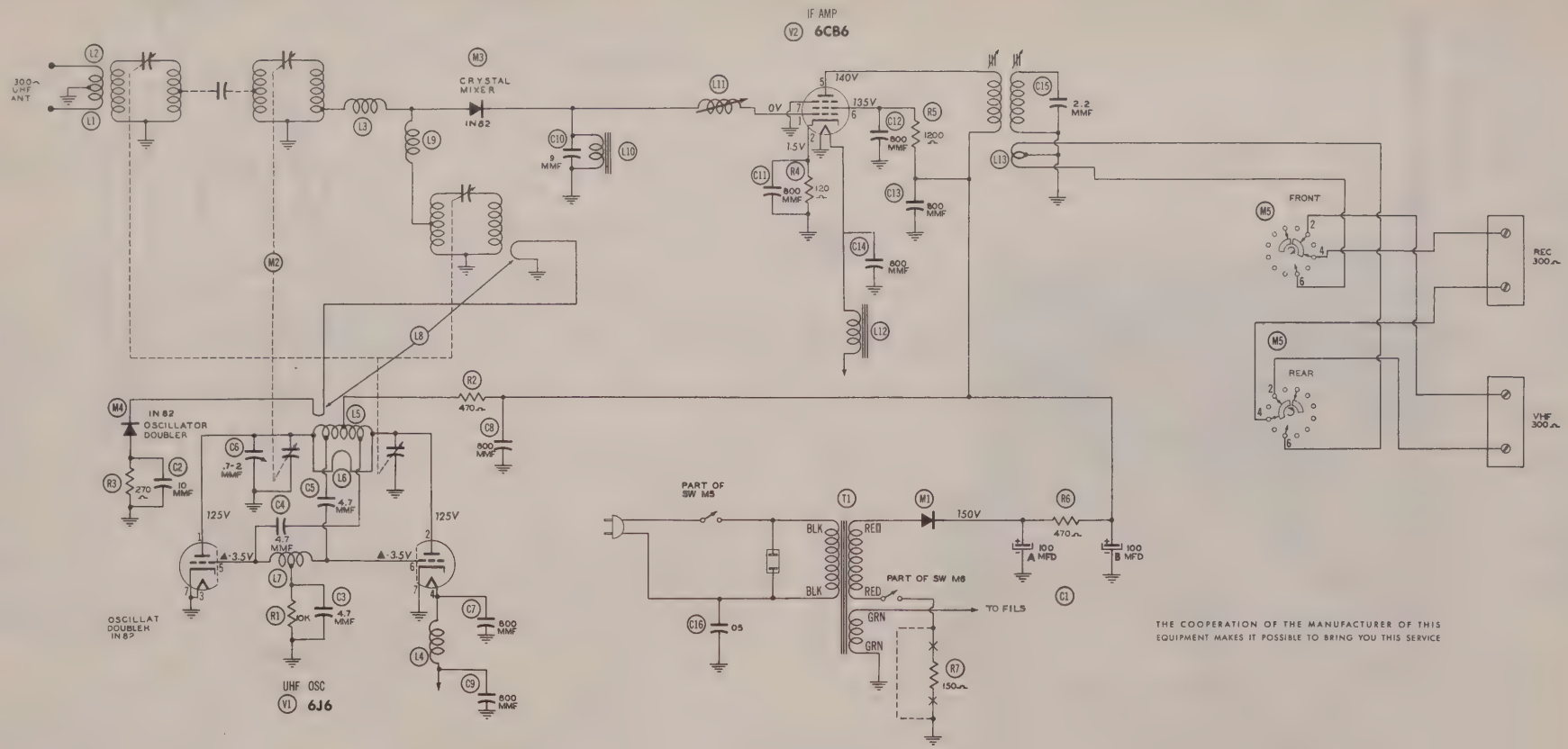
SILVERLINE MODEL 63A



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6J6	†940Ω	†940Ω	0Ω	.4Ω	10KΩ	10KΩ	0Ω
V 2	6CB6	.3Ω	120Ω	.4Ω	0Ω	†470Ω	†1.7KΩ	0Ω

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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1 - DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied.

PHOTOFACT* Folder

SPARTON MODELS 22312, 22313, 23322, 23323 (Ch. 29U213)

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MODEL 23322

SPARTON MODELS 22312, 22313, 23322, 23323 (Ch. 29U213)

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DATE 3–54 SET 232 FOLDER 8

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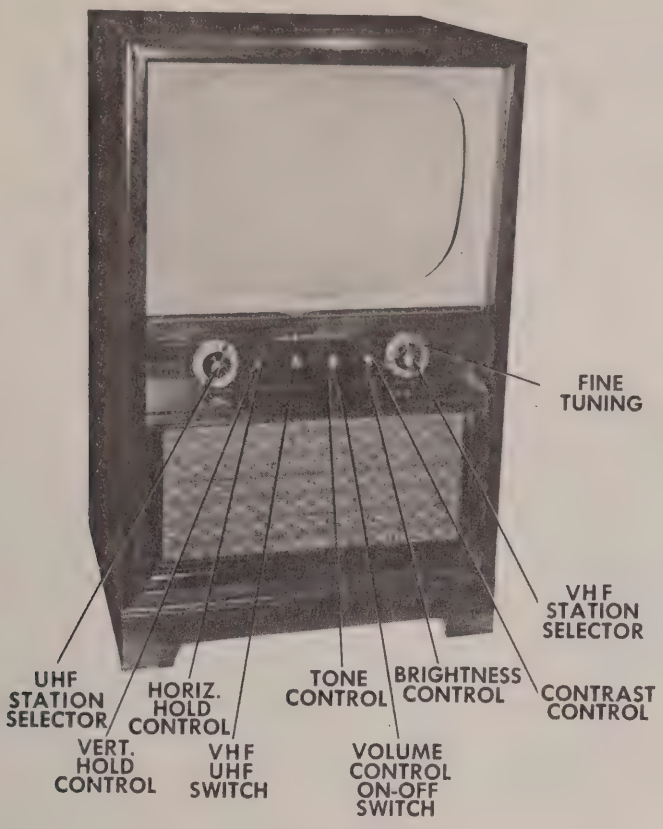

SPARTON MODEL 23322

TRADE NAME	Sparton Models 22312, 22313, 23322, 23323 (Ch. 29U213)
MANUFACTURER	Sparks-Withington Co., Jackson, Mich.
TYPE SET	Television Receiver
TUBES	Twenty-nine
POWER SUPPLY	110-120 Volts AC-60 cycle RATING 2.36Amp. @ 117 Volts
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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SPARTON MODELS 22312, 22313, 23322, 23323 (Ch. 29U213)

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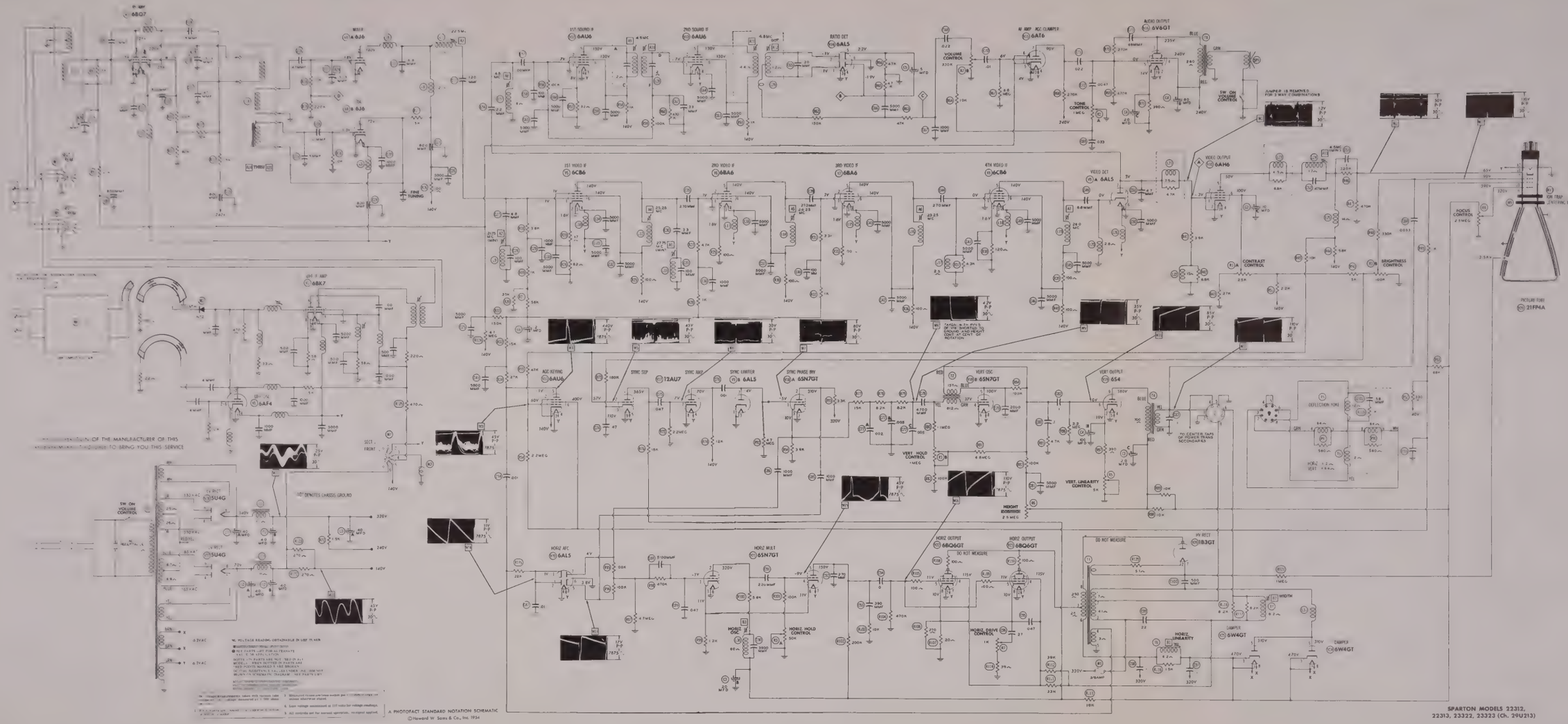
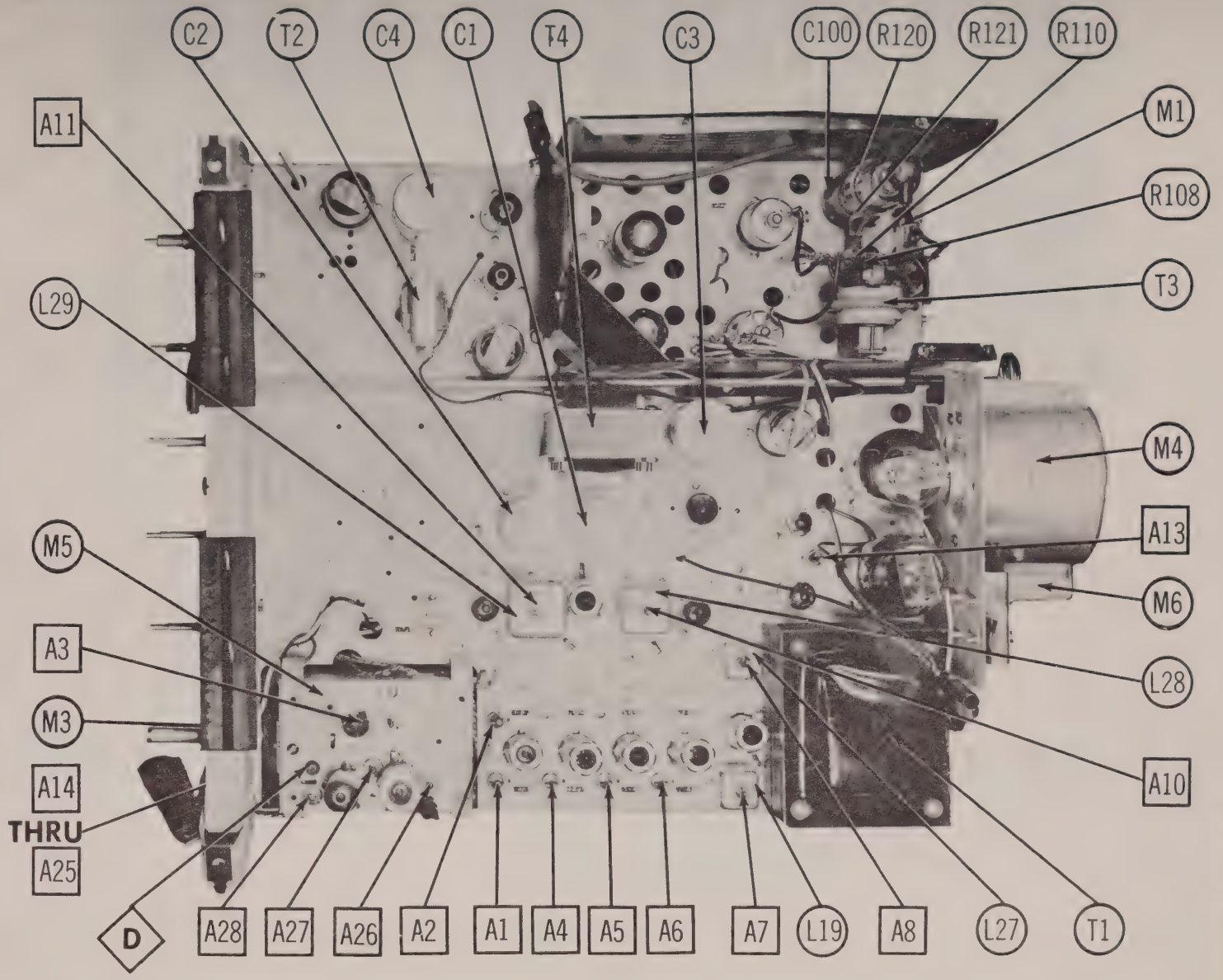


SPARTON MODELS 22312, 22313, 23322, 23323 (Ch. 29U213)



For tube location see tube placement chart page 5.

CHASSIS-TOP VIEW

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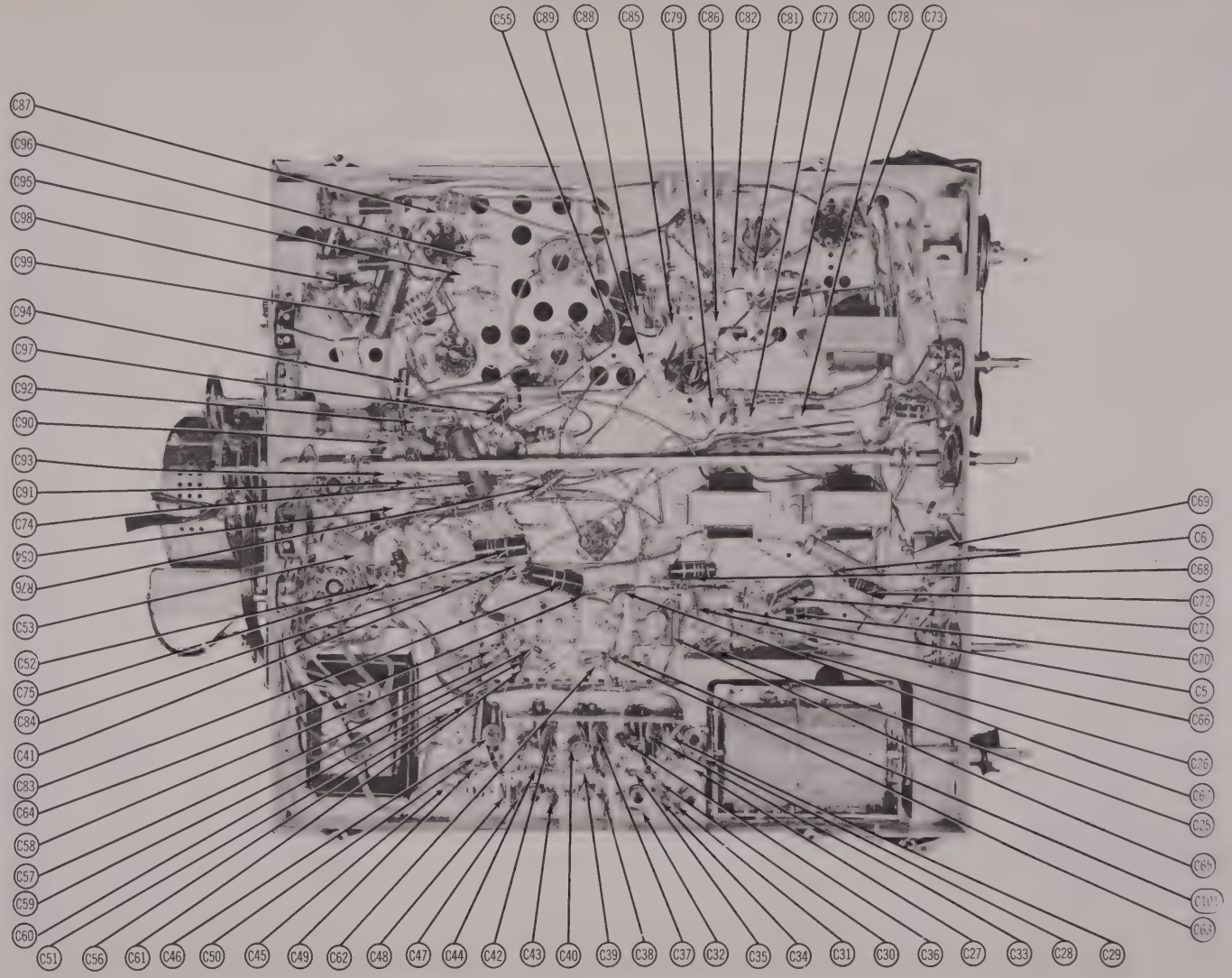

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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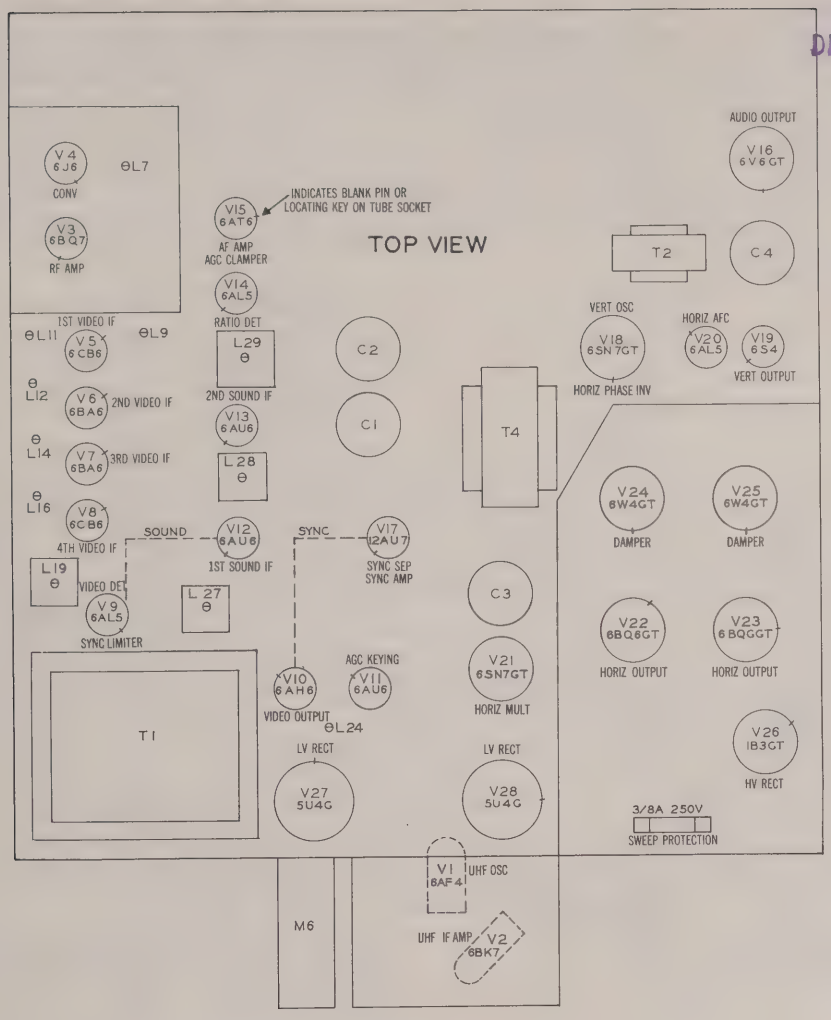


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V27, V28

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V4, V5, V6, V7, V8, V9 (V1, V2 UHF only)
No pic, no sound, has snow - V3, V4, V5
No pic, has sound, has raster - V10, V29
Has pic, no sound - V12, V13, V14, V15, V16
Overloaded picture - V11, V15

SYNC FAILURE
No vert. sync - V18,
No horiz. sync - V18, V20, V21
No vert. or horiz. sync - V9, V17, V18

SWEEP FAILURE
No raster, has sound - V21, V22, V23, V24, V25, V26, V29, Fuse (M1)
No vertical deflection - V18, V19
Poor vert. linearity or foldover - V18, V19
Poor horiz. linearity or foldover - V21, V22, V23, V24, V25
Narrow picture - V21, V22, V23, V24, V25, V26, V27, V28
Vert. off freq. - V18
Horiz. off freq. - V18, V20, V21

SPARTON MODELS 22312, 22313, 23322, 23323 (Ch. 29U213)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V4) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Remove 6AU6 (V11) from its socket. Connect the negative lead of a 4.5 volt bias supply to the ungrounded side of C6. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	27.75MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	21.75MC	"	"	A2	"
3.	"	"	22.5MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	25.25MC	"	"	A4	"
5.	"	"	24.25MC	"	"	A5	"
6.	"	"	23.25MC	"	"	A6	"
7.	"	"	26.0MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24.0MC (10MC Swp)	22.7MC 25.5MC 26.25MC	Any	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.		Check for response similar to Fig.1. If necessary, retouch A3 thru A7 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A8, A9 A10, A11	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A8, A9, A10, A11	Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
10.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A12	Reconnect stabilizer capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.001MFD	High side to point A. Low side to chassis.	4.5MC (Unmod)	"	DC probe thru detector (Fig. 4) to pin 11 of picture tube. Common to chassis.	A13	Adjust for minimum deflection.

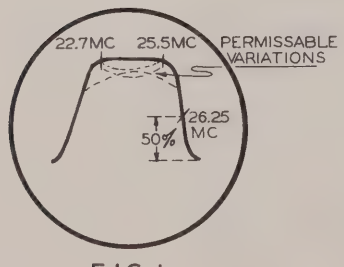


FIG.1

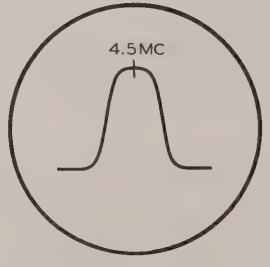


FIG. 2

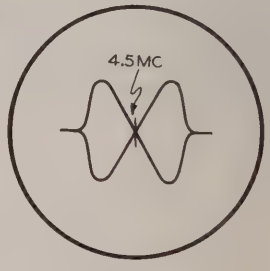


FIG.3

ALIGNMENT INSTRUCTIONS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

OSCILLATOR ALIGNMENT

Remove dummy converter tube and replace original 6J6 in its socket.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C25 . Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A25	

RF AND MIXER ALIGNMENT

Leave bias connected as under Oscillator alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point (D). Low side to chassis.	A26, A27 A28	Adjust for response curve similar to Fig. 6 with markers above 90%.
14.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Adjust for response curve similar to Fig. 6. If markers fall below 70% on any channel make compromise adjustment of A26, A27 and A28 with channel switch set to that channel then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF CONVERTER ALIGNMENT

The UHF converter portion of this receiver has been properly aligned at the factory and is very stable. If realignment should become necessary the entire UHF converter unit (with tubes) should be returned to the factory service department.

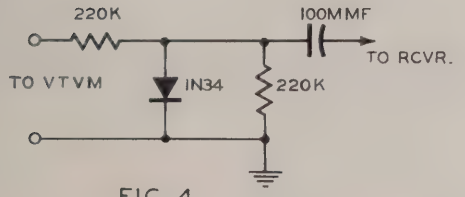


FIG. 4

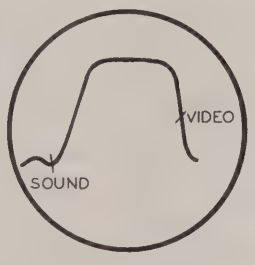


FIG. 5

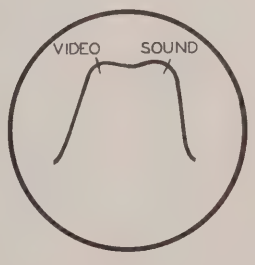
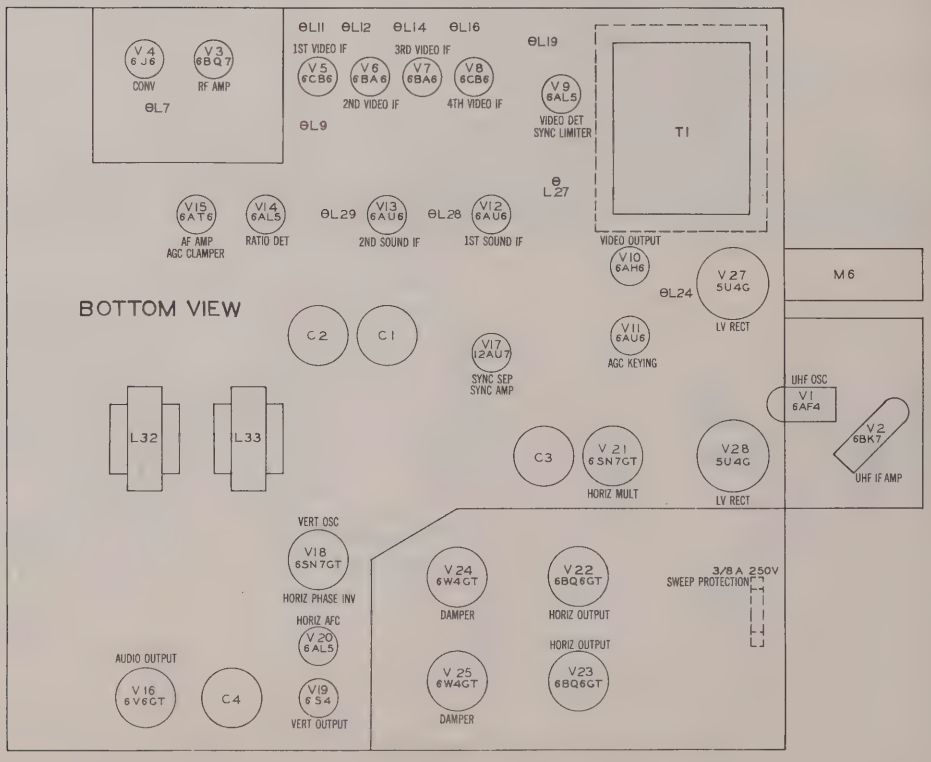


FIG. 6

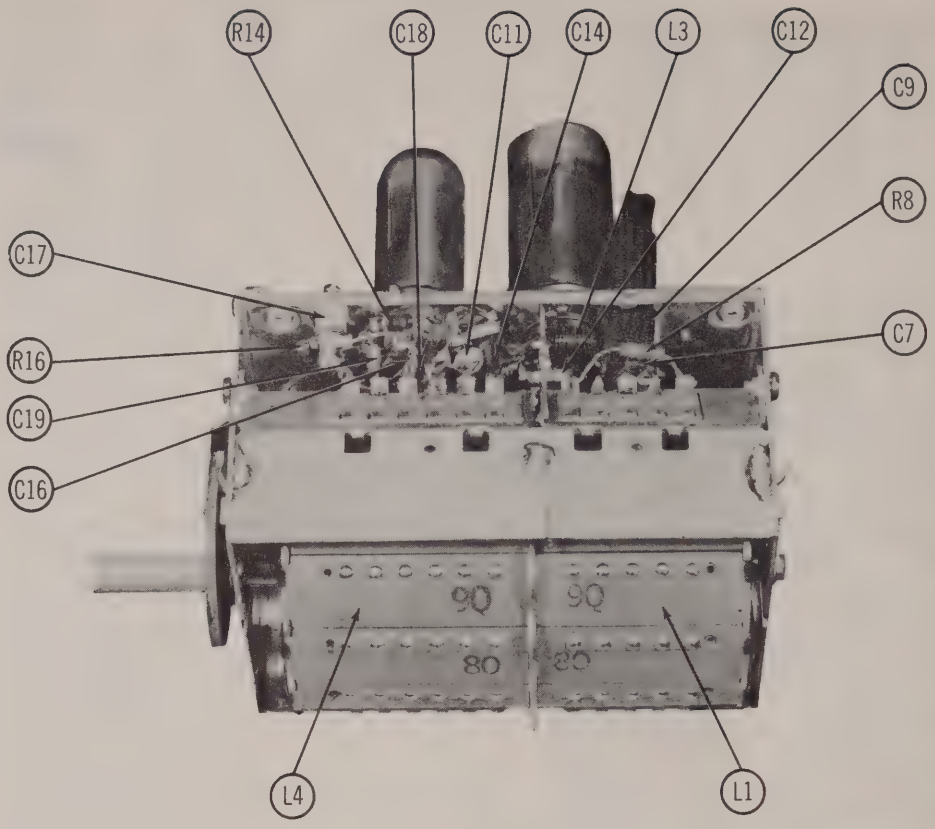
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 3	6BQ7A	INF	280KΩ	0Ω	.1Ω	0Ω	# 3.1KΩ	180KΩ	INF	0Ω
V 4	6J6	† 15.3KΩ	† 200Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 5	6CB6	38KΩ	130Ω	0Ω	.1Ω	† 350Ω	† 350Ω	82Ω		
V 6	6BA6	95KΩ	0Ω	0Ω	.1Ω	† 350Ω	† 350Ω	100Ω		
V 7	6BA6	93KΩ	0Ω	0Ω	.1Ω	† 350Ω	† 350Ω	100Ω		
V 8	6CB6	2.5Ω	120Ω	0Ω	.1Ω	† 450Ω	† 350Ω	0Ω		
V 9	6AL5	0Ω	3.9KΩ	0Ω	.1Ω	3Ω	0Ω	4.7Meg		
V 10	6AH6	3.9KΩ	0Ω	0Ω	.1Ω	† 5.8KΩ	† 502KΩ	0Ω		
V 11	6AU6	† 63KΩ	† 250Ω	0Ω	.1Ω	130KΩ	▲ 68KΩ	† 250Ω		
V 12	6AU6	670KΩ	0Ω	.1Ω	0Ω	† 1.2KΩ	† 1.2KΩ	82Ω		
V 13	6AU6	470KΩ	0Ω	0Ω	.1Ω	† 1.2KΩ	† 12.KΩ	0Ω		
V 14	6AL5	INF	INF	0Ω	.1Ω	4.7KΩ	0Ω	4.7KΩ		
V 15	6AT6	6.8Meg	0Ω	0Ω	.1Ω	240KΩ	240KΩ	# 270KΩ		
V 16	6V6GT	INF	.1Ω	# 1.9KΩ	† 1.6KΩ	470KΩ	740KΩ	0Ω	390Ω	
V 17	12AU7	▲ 28KΩ	† 16KΩ	† 200KΩ	.1Ω	.1Ω	# 12KΩ	2.2Meg	0Ω	0Ω-
V 18	6SN7GT	4.7Meg	# 3.4KΩ	3.9KΩ	1.5Meg	♦ 1.4Meg	0Ω	0Ω	.1Ω	
V 19	6S4	INF	1.5KΩ	2.2Meg	.1Ω	0Ω	2.2Meg	INF	INF	▲ 6KΩ
V 20	6AL5	22KΩ	22KΩ	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 21	6SN7GT	5.2Meg	▲ 16KΩ	1.2KΩ	120KΩ	▲ 210KΩ	1.2KΩ	0Ω	.1Ω	
V 22	6BQ6GT	INF	0Ω	INF	# 20KΩ	470KΩ	470KΩ	.1Ω	90Ω	TOP CAP ▲135Ω
V 23	6BQ6GT	INF	0Ω	1.2KΩ	# 20KΩ	470KΩ	INF	.1Ω	90Ω	TOP CAP ▲ 135Ω
V 24	6W4GT	INF	INF	300KΩ	▲68KΩ	# 125Ω	INF	300KΩ	300KΩ	
V 25	6W4GT	INF	INF	300KΩ	# 125Ω	# 125Ω	INF	300KΩ	300KΩ	
V 26	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 285Ω
V 27	5U4G	0Ω	30KΩ	INF	17Ω	INF	17Ω	INF	30KΩ	
V 28	5U4G	INF	120KΩ	3Ω	26Ω	470KΩ	25Ω	INF	120KΩ	
V 29	21FP4A	0Ω	† 380KΩ	PIN 6 ▲ 300KΩ	PIN 10 ▲ 69KΩ	PIN 11 † 180KΩ	PIN 12 .1Ω			

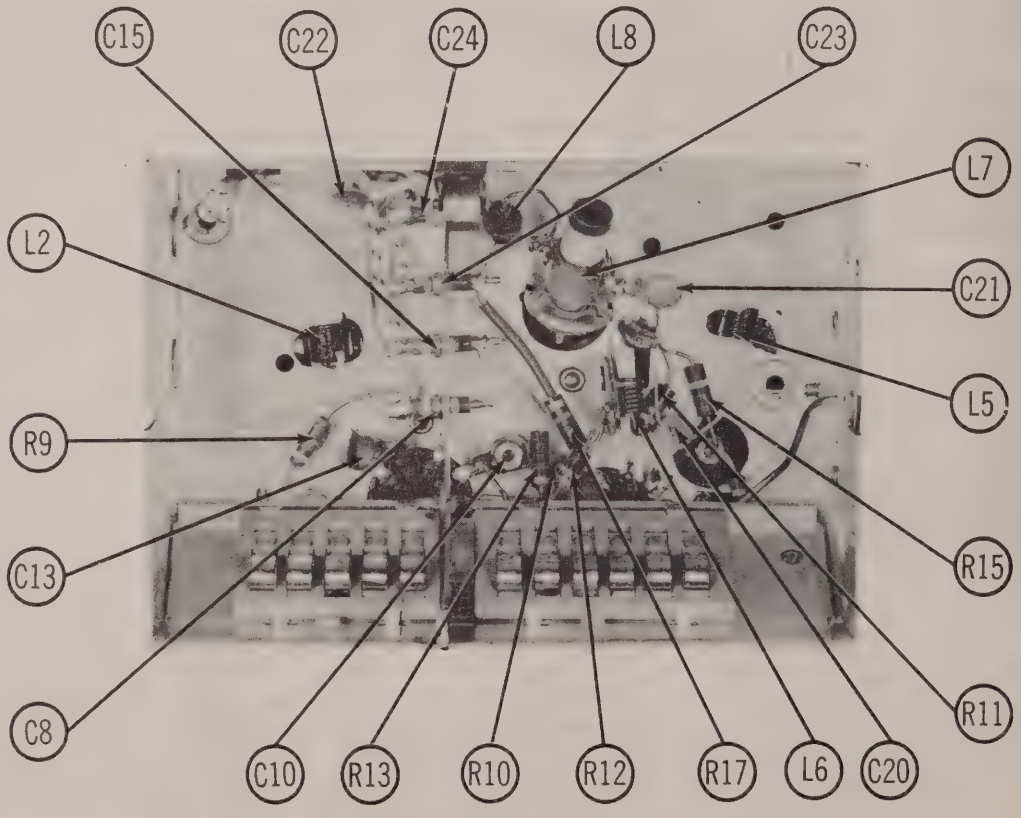
† MEASURED FROM PIN 8 OF V27.
# MEASURED FROM PIN 2 OF V28.
▲ MEASURED FROM PIN 3 OF V24.
NO RESISTANCE READING OBTAINABLE ON UHF TUNER.



TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-BOTTOM VIEW

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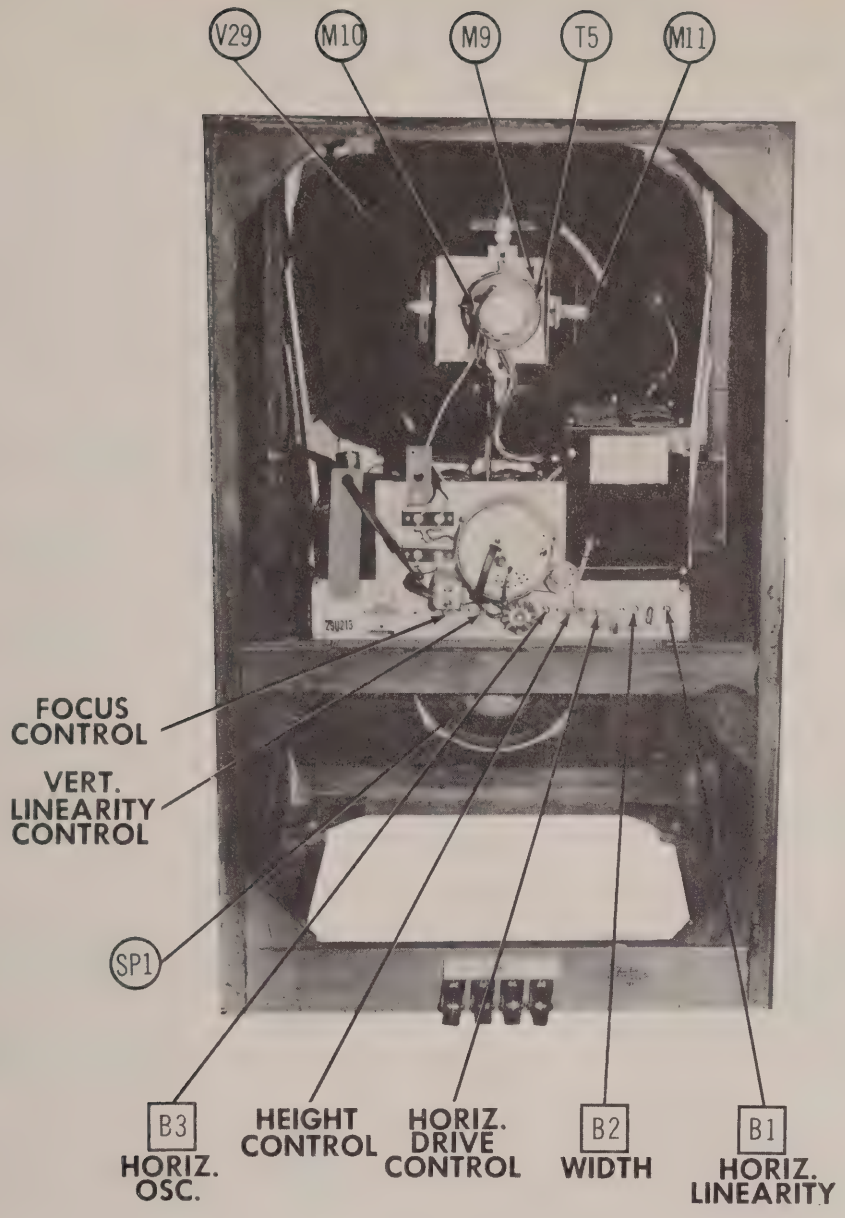
3021 DECATUR ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal linearity slug (B1) for a picture that is symmetrical from left to right.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Set the horizontal hold control fully counter clockwise. Adjust the horizontal drive control clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Set the horizontal hold control at mid position and adjust the horizontal oscillator slug (B3) for synchronization with approximately zero volts as measured with a VTVM from pin 1 (grid) of 6SN7 (V21) to chassis.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V21, V22, V23, V24, V25 and V28. Check adjustment of horizontal drive control, B1 and B2. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check R111, R112, R116, C95, C97, C98, R117, R118, T3, T5A and other associated circuit components.	Check R99, R100, R102, R104, R113, C91, C92, C93, C94 and other associated circuit components.

DRIVE LINES

Check adjustment of horizontal drive control. Check by substitution V21, V22, V23, V24 and V25. Check T3, T5A, C92, C93, C94, C97, C98 and other associated circuit components for failure or change of value.

COMPRESSED LEFT SIDE

Check by substitution V21, V22, V23, V24 and V25. Check horizontal output and damper components especially T3 and T5A. Proceed as outlined under "Insufficient Sweep".

PIE CRUST EFFECT

Check by substitution V22, V23, V24 and V25. Check C89 for open.

FOLDS

Follow procedure outlined under "Drive Lines".

XMAS TREE EFFECT

Substitute V21. Check C90, C91, C92, L30 and other associated circuit components.

VERTICAL

LOSS OF SWEEP

Check by substitution V18 and V19. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R87, R5 and other associated circuit components.	Check R83, R86, R88, R89, R6, C80, C82 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V18 and V19. Check C4A, F4 and T5B. Check other associated circuit components.

COMPRESSED AT TOP

Check by substitution V18 and V19. Check C79, C80, C82, R85, R86 and other associated circuit components.

FOLDS

Substitute V18 and V19. Check components associated with V18B and V19 for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V17 and V18. Check components associated with V17 and V18A for failure or change of value.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V18B.	Check components associated with V17 and V18A.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V20 and V21. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check C85, C86, R95, R96 and other associated components.	Check components associated with V21 especially C90, C91 and C92.

HORIZONTAL BENDING

Check by substitution V20, V21, V22 and V23. Check circuit near these stages for filament shorts. Check horizontal AFC filter network (R97, R98, C88, C89) components for failure or change of value.

VIDEO

LOSS OF VIDEO

Substitute V10. Check picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Check adjustment of fine tuning. Check adjustment A13. Check video IF alignment

POOR CONTRAST

Check by substitution V9 and V10. Check picture tube and other associated components.

NEGATIVE PIX

Check by substitution V9, V10 and V11. Check AGC network components. Check picture tube.

SMEAR

Substitute V9 and V10. Check C2C, C53, R44, R47, R48, L21, L23, picture tube and other associated circuit components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V3, V4, V5, V6, V7, V8, V9 and V10 for heater to cathode leakage. Check B+ filter capacitors for open. In case of UHF check V1 and V2.

AUDIO

WEAK OR NO SOUND

Check by substitution V12, V13, V14, V15 and V16. Check stages V15 and V16 using audio signal generator. Apply signal across R67.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V15 and V16.

BUZZ

Check adjustment of the fine tuning. Adjust A12 for minimum buzz. If buzz is still objectionable, substitute V14 and realign audio IF and ratio detector stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PROPERTY OF
L F BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		SPARTON PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	UHF IF Amplifier	6BK7	6BK7	9AJ	
V3	RF Amplifier	6BQ7	6BQ7	9AJ	
V4	Converter	6J6	6J6	7BF	
V5	1st Video IF Amp.	6CB6	6CB6	7CM	
V6	2nd Video IF Amp.	6BA6	6BA6	7BK	
V7	3rd Video IF Amp.	6BA6	6BA6	7BK	
V8	4th Video IF Amp.	6CB6	6CB6	7CM	
V9	Video Det. - Sync Limiter	6AL5	6AL5	6BT	
V10	Video Output	6AH6	6AH6	7BK	
V11	AGC Keying	6AU6	6AU6	7BK	
V12	1st Sound IF Amp.	6AU6	6AU6	7BK	
V13	2nd Sound IF Amp	6AU6	6AU6	7BK	
V14	Ratio Detector	6AL5	6AL5	6BT	
V15	AF Amp. - AGC Clamper	6AT6	6AT6	7BT	
V16	Audio Output	6V6GT	6V6GT	7S	
V17	Sync Separator - Sync Amplifier	12AU7	12AU7	8BE	
V18	Sync Phase Inv. - Vert. Oscillator	6SN7GT	6SN7GT	8BD	
V19	Vert. Output	6S4	6S4	9AC	
V20	Horiz. AFC	6AL5	6AL5	6AT	
V21	Horiz. Mult	6SN7GT	6SN7GT	8BD	
V22	Horiz. Output	6BQ6GT	6BQGT	6AM	
V23	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V24	Damper	6W4GT	6W4GT	4CG	
V25	Damper	6W4GT	6W4GT	4CG	
V26	HV Rectifier	1B3GT	1B3GT	3C	
V27	LV Rectifier	5U4G	5U4G	5T	
V28	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				RETMA BASE TYPE	NOTES
	SPARTON PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.		
V29	21FP4A	21FP4A 21FP4 ①	21FP4A 21FP4 ①	21FP4A	12L 12M	① Add high voltage filter cap

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SPARTON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	475	PA4307-13	AFH2-72		BO53		FP262	TVL-2830	
B	▲40	475								
C2A	■40	250	PA4307-21	AFH3-43		CO34		FP376.8	TVL-3785	
B	▲40	250								
C	▲10	200								
C3A	▲40	475	PA4307-22	AFH4-94		DO17		FP444	TVL-4840	
B	▲20	450								
C	■20	450								
C4A	■100	50	PA4307-23	AFH4-87		C109		FP375	TVL-3704	
B	▲80	450				BR205		TC36		
C	▲20	50								
C5	5	50	PA4308-2	PRS150/4		BR550		TC30	TVA-1303	
C6	2	50	PA4303-14	PRS150/4		BBR2-50T		TC302	TVA-1301	
C7	3-9				829-10					
C8	800			EF-001	MFT-1000				503C-D1	
C9	3									
C10	.5-3				829-3			CT565A		
C11	47			BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C12	800			EF-001	MFT-1000				503C-D1	
C13	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C14	1.5			SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C15	800			EF-001	MFT-1000				503C-D1	
C16	47			BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C17	.5-3				829-3			CT565A		
C18	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C19	5									
C20	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C21	6.8			SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C22	120			SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C23	800			EF-001	MFT-1000				503C-D1	
C24	800			EF-001	MFT-1000				503C-D1	
C25	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	6.8		PA4328-13	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C28	100		PA4332-3	SI100NP0	TCZ-100		NP0-333-101	ZT-531	5TCC-T1	
C29	1000		HK36M-102	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C30	3.3		PA4326-4	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	
C31	100		PA4332-3	SI100NP0	TCZ-100		NP0-333-101	ZT-531	5TCC-T1	
C32	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C33	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	270		HK36M-271	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C36	1000		HK36M-102	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C37	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C38	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C39	270		HK36M-271	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C40	1000		HK36M-102	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C41	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C42	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C43	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C44	270		HK36M-271	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C45	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C46	5000		PA4334-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA SPARTON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C47	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C48	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C49	5.8		PA4338-13	5I5NP0	TCZ-5.8		NP0K-5R8	ZT-5568	5TCCB-V58	
C50	5000		PA4338-14	5I5NP0	TCZ-5.8	TMSD5	NP0K-5R8	ZT-5568	5TCCB-V58	
C51	4.7		PA4338-12	5I5NP0	TCZ-4.7		NP0K-4R7	ZT-555	5TCCB-V47	
C52	47		CC30A-470F	5I47NP0	TCZ-47		NP0K-470	ZT-5447	5TCC-Q47	
C53	.1	400	PC4GM-104	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C54	.001	600	PC4GM-102	P688-001	D6-102	PTE5D1	GP3L-102	PT821	6TM-D1	
C55	.1	600	PC4GM-104	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C56	2.2		PA4338-1	5I2.2NP0	TCZ-2.2		NP0K-2R2		5TCCB-V22	
C57	100		PA4332-3	5I100NP0	TCZ-100		NP0-333-101	ZT-531	5TCC-T1	
C58	300		PA4333-3	5I100NP0	TCZ-100		NP0-333-101	ZT-531	5TCC-T1	
C59	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C60	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C61	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C62	33	500	MC90K-330							
C63	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C64	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C65	120		PA4333-1	5I120NP0	TCZ-120		NP0-333-121		5TCC-T12	
C66	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C67	1000		HE35M-102	5I1000	D6-102	TMSD1	GP2L-102	UC-521	5HK-D1	
C68	.022	400	PC4CL-223	P488-022	DF-203	PTE4S3		PT4133	4TM-S22	
C69	.033	200	PC42GK-333	P488-033						
C70	.01	400	PC4GL-103	P488-01	D6-103	PTE4S1	GP3-333-103	PT411	4TM-S1	
C71	.022	600	PC4CM-223	P688-022	DF-203	PTE6S3		PT4132	6TM-S22	
C72	.0047	600	PC4GM-472	P688-0047	D6-472	PTE6D47	GP3-333-472	PT6247	6TM-D47	
C73	68	500	MC90E-680	1469-00007		5R5QT			MS-47	
C74	.47	200	PC42DK-474	P388-47		PTF2P5		PT4047	2TM-P47	
C75	.047	600	PC4GM-473	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C76	.001	600	PC4GM-102	P688-001	D6-102	PTE6D1	GP2L-102	PT821	6TM-D1	
C77 A	.002		PA4339-4	PA109	D6-502	PTE4D2	GP2-333-202	PT823	4TM-D23	
B	.005				D6-502	PTE4D5	GP2-333-502	PT825	34C17	
C	.005				D6-502	PTE6D5	GP2-333-502	PT825		
C78	4700	500	MC61F-472	1464-005		1DRD5		MCB545	MS-35	
C79	2000	500	MC61E-202	1464-002		1RD2		MCB457		
C80	.1	400	PC4GL-104	P488-1		PTE4P1		PT401	4TM-P1	
C81	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C82	.1	400	PC4GL-104	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C83	.1	400	PC4GL-104	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C84	.0033	600	PC4GM-332	P688-0033	D6-332	PTE6D33	GP3-333-332	PT6233	6TM-D33	
C85	1000	500	MC61E-102	1479-001		2R6D1		MCB255	MS-21	
C86	1000	500	MC61E-102	1479-001		2R6D1		MCB255	MS-21	
C87	.01	400	PC42FL-103	P488-01		PTE4S1		PT411	4TM-S1	
C88	5100	500	MC61E-512							
C89	.047	200	PC42GK-473	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C90	3900	500	MC63F-392	1464-004		1DRD4		MCB463	MS-34	
C91	220	500	MC60E-221							
C92	270	500	MC60E-271	1469-0003		5R5T3		MCB231	MS-33	
C93	390	500	MC60E-391	1469-0004		5R5T4		MCB243	MS-34	
C94	.01	400	PC4GL-103	P488-01	D6-103	PTE4S1	GP3-333-103	PT411	4TM-S1	
C95	.047	400	PC4GL-473	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C96	.27	200	PC4GK-274							
C97	.1	400	PC4GL-104	P488-1		PTE4P1		PT401	4TM-P1	
C98	.1	400	PC4GL-104	P488-1		PTE4P1		PT401	4TM-P1	
C99	.22	400	PC4GL-224	P488-22		PTE4P22		PT4025	4TM-P22	
C100	500	20000	PA4343-3	HV20C	TV3-502	MM-C20TS	413-501	HV20035A	30DK-T5	
C101	5000		PA4334-1	BPD-005	DD-502	TMSD5	811-005	DC-525	5HK-D5	
C102	56	2000	PA4354-5						20CA-Q56	

CONTROLS

ITEM No	RATING RESIST ANCE	RATING WATTS	REPLACEMENT DATA SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	25KΩ		PA-4457	* QJ-469	RTV-411		UF253L †	Contrast-panel
B	100KΩ		Not Req.				UR18L	Brightness-rear
R2A	1Meg		PA-4450-2	* QJ-468	RTV-412		UF18L	Tone-panel Note
B	330KΩ		Not Req.				UR3547T4 ▲	Volume-rear tapped at 60K
C	Switch		Not Req.				US-27	Attach to R2B
R3A	50KΩ		PA-4456	■ QJ-470	RTV-410		UF50L ††	Horiz. Hold-panel
B	1Meg		Not Req.				UR18L	Vert. Hold-rear
R4A	2.5Meg	½	PA-4454	QU1-239	AG-84-S	AB-83	SU-565	Focus
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	5000Ω	2	PA-4411	WK-5000	A43-5000	VK-125	R5000L	Vert. Linearity wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	2.5Meg	½	PA-4454	QU1-239	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	1000Ω	2	PA-4448	WK-1000	A43-1000		R1000L	Horiz. Drive wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4		Not Req.	Attach to R7A

Note: Some models may use alternate control Part No. PA-4450-4.

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B1l-120 & P1-112 (Panel) B1l-128 & R1-126 (Rear).

♦ CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B1l-137 & R1-130 (Panel) B1S-132X & R1-130 (Rear) & SWITCH 76-2.

■ CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B1l-123 & P1-112 (Panel) B1l-137 & R1-126 (Rear).

† Universal replacement (Mallory Exact duplicate Part, No. UE814).

†† Universal replacement (Mallory exact duplicate Part No. UE1003).

▲ Universal replacement (Mallory exact duplicate Part No. UE16645).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SPARTON PART No.	IRC PART No.	NOTES
R8	15KΩ			BTS-15K	
R9	47KΩ			BTS-47K	
R10	100KΩ			BTS-100K	
R21	160KΩ			BTS-160K	
R12	100KΩ			BTS-100K	
R13	1500Ω			BTS-47 5%	
R14	10KΩ			BTS-10K	
R15	220KΩ			BTS-220K	
R16	10KΩ			BTS-10K	
R17	15KΩ			BTS-15K	
R18	3800Ω 5%		BRI2G-382	BTS-3800 5%	
R19	1000Ω		BRI3N-102	BTS-1000	
R20	33KΩ		BRI2S-333	BRS-33K	
R21	56KΩ		BRI2S-563	BTS-56K	
R22	150KΩ		BRI2S-154	BTS-150K	
R23	470Ω 5%		BRI2G-470	BTS-47 5%	
R24	82Ω 5%		BRI2G-820	BTS-82 5%	
R25	100Ω		BRI2N-101	BTS-100	
R26	100Ω		BRI2N-101	BTS-100	
R27	4700Ω		BRI2G-472	BTS-4700	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SPARTON PART No.	IRC PART No.	NOTES
R28	1000Ω		BRI2N-102	BTS-1000	
R29	100Ω 5%		BRI2G-101	BTS-100 5%	
R30	100Ω		BRI2N-101	BTS-100	
R31	3300Ω 5%		BRI2S-332	BTS-3300 5%	
R32	1000Ω		BRI2N-102	BTS-1000	
R33	15KΩ 5%		BRI2G-153	BTS-15K 5%	
R34	27KΩ	1	CRI2S-273	BTA-27K	
R35	100Ω 5%		BRI2G-101	BTS-100 5%	
R36	100Ω		BRI2N-101	BTS-100	
R37	4300Ω 5%		BRI2G-432	BTS-4300 5%	
R38	130Ω 5%		BRI2S-131	BTS-130 5%	
R39	100Ω		BRI2N-101	BTS-100	
R40	1000Ω		BRI2N-102	BTS-1000	
R41	3900Ω 5%		BRI2G-392	BTS-3900 5%	
R42	6800Ω		BRI2S-682	BTS-6800	
R43	27KΩ		BRI2S-273	BTS-27K	
R44	56000Ω 5%	2	DRI2G-563	BTS-5600 5%	
R45	10KΩ		BRI2S-103	BTS-10K	
R46	220KΩ		BRI2S-224	BTS-220K	
R47	470KΩ		BRI2S-474	BTS-470K	
R48	330KΩ		BRI3N-334	BTS-330K	
R49	1000Ω		BRI2N-102	BTS-1000	
R50	15KΩ		BRI2S-153	BTS-15K	
R51	2200Ω		BRI2G-222	BTS-2200	
R52	330KΩ		BRI2S-334	BTS-330K	
R53	68KΩ	1	CRI2S-683	BTA-68K	
R54	2.2Meg		BRI2S-225	BTS-2.2Meg	
R55	47KΩ		BRI2S-473	BTS-47K	
R56	100KΩ		BRI2S-104	BTS-100K	
R57	82Ω 5%		BRI2G-820	BRS-82 5%	
R58	1000Ω		BRI2N-102	BTS-1000	
R59	100KΩ		BRI2N-104	BTS-100K	
R60	470KΩ		BRI2S-474	BTS-470K	
R61	1000Ω		BRI2N-102	BTS-1000	
R62	150Ω 5%		BRI2G-151	BTS-150 5%	
R63	47KΩ		BRI2S-473	BTS-47K	
R64	100KΩ		BRI2S-103	BTS-10K	
R65	4700Ω 5%		BRI2G-472	BTS-4700 5%	
R66	4700Ω 5%		BRI2G-472	BTS-4700 5%	
R67	6.8Meg		BRI2N-685	BTS-6.8Meg	
R68	270KΩ		BRI2S-274	BTS-270K	
R69	470KΩ		BRI2N-474	BTS-470K	
R70	270KΩ		BRI2S-274	BTS-270K	
R71	390Ω	1	CRI2S-391	BTA-390	
R72	1500Ω	10	PA4200-19	1 3/4A-1500	
R73	180KΩ		BRI2S-184	BTS-180K	
R74	12KΩ		BRI2S-123	BTS-12K	
R75	2.2Meg		BRI2N-225	BTS-2.2Meg	
R76	18KΩ		BRI2S-183	BTS-18K	
R77	15KΩ		BRI2S-153	BTS-15K	
R78	8200Ω		BRI2S-822	BTS-8200	
R79	8200Ω		BRI2S-822	BTS-8200	
R80	1.1Meg 5%		BRI2C-115	BTS-1.1Meg 5%	
R81	6.8Meg		BRI2S-685	BTS-6.8Meg	
R82	100KΩ		BRI2S-104	BTS-100K	
R83	100KΩ		BRI2S-104	BTS-100K	
R84	100KΩ		BRI2S-104	BTS-100K	
R85	4700Ω		BRI2S-472	BTS-4700	
R86	2.2Meg		BRI2N-225	BTS-2.2Meg	
R87	390Ω		BRI2S-391	BTS-390	
R88	10KΩ	2	DRI2S-103	BTB-10K	
R89	10KΩ	2	DRI2S-103	BTB-10K	
R90	560Ω		BRI2S-561	BTS-560	
R91	560Ω		BRI2S-561	BTS-560	
R92	4.7Meg		BRI2S-475	BTS-4.7Meg	
R93	3300Ω 5%		BRI2G-332	BTS-3300 5%	
R94	3900Ω		BRI2G-392	BTS-3900	
R95	100KΩ 5%		BRI2C-104	BTS-100K 5%	
R96	100KΩ 5%		BRI2C-104	BTS-100K 5%	
R97	4.7Meg		BRI2S-475	BTS-4.7Meg	
R98	470KΩ		BRI2S-474	BTS-470K	
R99	120Ω		BRI2S-121	BTS-1200	
R100	5600Ω 5%		CRI2C-562	BTA-5600 5%	
R101	100KΩ		BRI2S-104	BTS-100K	
R102	200KΩ		BRI2C-204	BTS-200K	
R103	10KΩ		BRI2S-103	BTS-10K	
R104	470KΩ		BRI2S-474	BTS-470K	
R105	100Ω		BRI2N-101	BTS-100	
R106	270Ω	1	CRI2S-271	BTA-270	
R107	120Ω	2	DRI2S-121	BTB-120	
R108	100Ω	1	CRI2M-101	BTA-100	
R109	100Ω		BRI2N-101	BTS-100	
R110	100Ω	1	CRI2N-101	BTA-100	
R111	33KΩ	2	DRI2S-333	BTB-33K	
R112	39KΩ	2	DRI2S-393	BTB-39K	
R113	10KΩ	2	DRI2S-103	BTB-10K	
R114	39Ω		BRI2S-390	BTS-39	
R115	22KΩ	1	CRI2S-223	BTA-22K	
R116	1500Ω	1	CRI2N-152	BTA-1500	
R117	8200Ω	2	DRI2S-822	BTB-8200	
R118	8200Ω	2	DRI2S-822	BTB-8200	
R119	1000Ω		BRI2N-102	BTS-1000	
R120	5.1Ω		BRW12S-5l		
R121	1Meg	1	CRI1N-105	BTA-1Meg	
R122	270Ω	2	DRI2S-271	BTB-270	
R123	270Ω	2	DRI2S-271	BTB-270	
R124	4.7Meg		BRI2S-475	BTS-4.7Meg	
R125	4700Ω 5%	2	DRI2S-471	BTB-470 5%	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA SPARTON PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC @2.36A	656VCT .220ADC SEC. 4	330VCT @3A SEC. 5	5VAC @3A SEC. 6	AB-44035-1					
		5VAC @3A	6.3VAC @2.4A	6.3VAC @10.8A						

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI	RATING DC RESISTANCE SEC.	SPARTONE PART No.	REPLACEMENT DATA STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	157Ω	812Ω	AB-47006-4	A-8111	A-3060	B6700	A-97X①		Vert.Osc. Trans.
T3	278.5Ω tap ②	4.8Ω tap ③ 4.1Ω	PC-70012	A-8136① ④	HVO-10④ ⑤	FB410⑤	D-33	231T1 & 216R1 ⑫	Horiz.Output Trans.
	28.5Ω	SEC. 2 3Ω							
		SEC. 3 0Ω							
T4	700Ω	7Ω	AB-44062-7	A-8115	A-3035	Z1800	A-101U	204T2	Vert.Output Trans.
T5A	12Ω		AB-43071-1⑰	DY-8A ⑤ ⑪	MDF-70⑤⑪ ⑮	DF601⑤ ⑪	T-12 ⑤⑪	308D1⑤⑪	Vert.Deflection Coils
B	64Ω								
T6	8.2Ω		AA-6400-3		MWC-2⑪		WC-12⑪		Horiz. Linearity Coil
T7	5.2Ω		AA-6400-3		MWC-2⑪		WC-12⑪		Width Coil

① Drill one new mounting hole.
② Drill new mounting holes.
③ Connect original terminal #7 to new terminal #2, original #6 to new #1, original #1 to new #4, original #2 to new #5, original #3 to new #7, original #4 to new #8, original #5 to new #9. Remove R117 & R118 and connect width coil across terminal #6 and #7.
④ Mount in side of high voltage cage.
⑤ Connect original terminal #7 to new terminal #2, original #6 to new #1, original #1 to new #4, original #2 to new #4, original #3 to new #6, original #4 to new #8, original #5 to new #9.
⑥ Use Fig. 1 of instruction sheet packed with unit for terminal connections, except, connect yoke in series with width coil across terminals #8 and #7.
⑦ Yoke assembly contains yoke. (part #PC-70018A).
⑧ Use original horizontal deflection coil network if necessary.
⑨ Enlarge mounting hole.
⑩ Connect to coded blue and green terminals.
⑪ Use original cover and positioning device.
⑫ Use Fig.1 of instruction booklet packed with unit for terminal connections, except, remove original w idth coil and R117 & R118.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA SPARTON PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	NOTES
T8	6.4KΩ	3.6Ω	26Ω	.32Ω	AB44066-3	A-3823	A-3020	Z-1009	S-9Z	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA SPARTON PART No.	VIKING PART No.	QUAM PART No.	NOTES
S P1A	10"	PM	3.6Ω	PC6300-61	10J11	10A31	① Used in models 22312, and 22313
SP1B	6"	PM	3.6Ω	PC6300-63 ①	6J4	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SPARTON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coils	0Ω CT	0Ω					
L2	Pil. Choke	0Ω						
L3	Neutr.Coil	0Ω						
L4	RF, Mixer Grid & Osc. Coils	0Ω						
L5	Pil. Choke	0Ω						
L6	RF Choke	0Ω						
L7	1st. Video IF	.9Ω						
L8	RF Choke	1.3Ω						
L9	21.75MC Trap	0Ω		AB43523-12	19-1020	TV-12	6171	
L10	Pil. Choke	.1Ω		AA6651-1	19-3001	TV-189	4606	2 Microhenries
L11	27.75MC Trap	0Ω		AB43523-13	20-1006		6171A	
L12	2nd. Video IF	.1Ω		AA6408-1	17-1003	TV-102	6188	
L13	Pil. Choke	.1Ω		AA6651-1	19-3001	TV-189	4606	2 Microhenries
L14	3rd. Video IF	.1Ω		AA6408-1	17-1004	TV-102	6189	
L15	Pil. Choke	.1Ω		AA6651-1	19-3001	TV-189	4606	2 Microhenries
L16	4th.Video IF	.1Ω		AA6408-1	17-1004	TV-102	6189	
L17	RF Choke	2.5Ω		AA6650-1			4626	25 Microhenries
L18	Pil. Choke	.1Ω		AA6651-1	19-3001	TV-189	4606	2 Microhenries
L19	5th.Video IF	.4Ω		AA6354-1	17-1001 †	TV-100 †	6186 †	
L20	RF Choke	2.8Ω		AA6650-1			4626	25 Microhenries
L21	Series Peaking Coil	7.5Ω		AA6402-8	19-3160 *		4644 *	146 Microhenries, wound on 4.7KΩ resistor
L22	Shunt Peaking Coil	17Ω		AA6613-8	19-3660	TV-188	4650	600 Microhenries
L23	Series Peaking Coil	9.5Ω		AA6402-7	19-4200	TV-194 ■	4646 ■	213 Microhenries, wound on 6.8KΩ resistor
L24	4.5MC Trap	1.7Ω		AA6407-1	20-1004	TV-151	1470	
L25	Shunt Peaking Coil	14Ω		AA6613-10	19-3523	TV-188	4586	430 Microhenries
L26	21.1 Choke	.1Ω		AA6651-1	19-3001	TV-189	4606	2 Microhenries
L27	1st. Sound IF	1.8Ω		AA6364-2	17-1031			
L28	2nd. Sound IF	2Ω	2Ω	AA6667-5	17-1031 ▲	TV-108 ▲	1486 ▲	
L29	Ratio Det.	4.4Ω	1.2ΩCT	AA6584-4	17-3402 ▲	TV-115 †	6205 †	Tertiary winding -.1Ω
L30	Horiz.Osc.	80Ω		AA6403-2	19-1576	TV-183	6210	
L31	RF Choke	.4Ω		AA6650-8			4608	3.2 Microhenries

† Deluxe Unit
† Parallel with 4.7KΩ resistor
■ Parallel with 6.8KΩ resistor
▲ Drill new mounting holes.
△ Disconnect C65.
† Use adaptor plate and disconnect C65.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 (A.)	REPLACEMENT DATA SPARTON PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
L32	.220ADC	11Ω	5. 3HY	AB470009-1	C-3327		C5040	C-15X ①
L33	.120ADC	11Ω	5. 3HY	AB470009-1				C-15X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA SPARTON PART No. FUSE	SPARTON PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
M1	3AG P/T	3/8A 250V	PA4212-3		318.375 (3AG P/T-3/8A)		GJV 3/8	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA SPARTON PART No.	SYLVANIA PART No	NOTES
M2	1N72		1N82 or 1N82A	UHF Mixer

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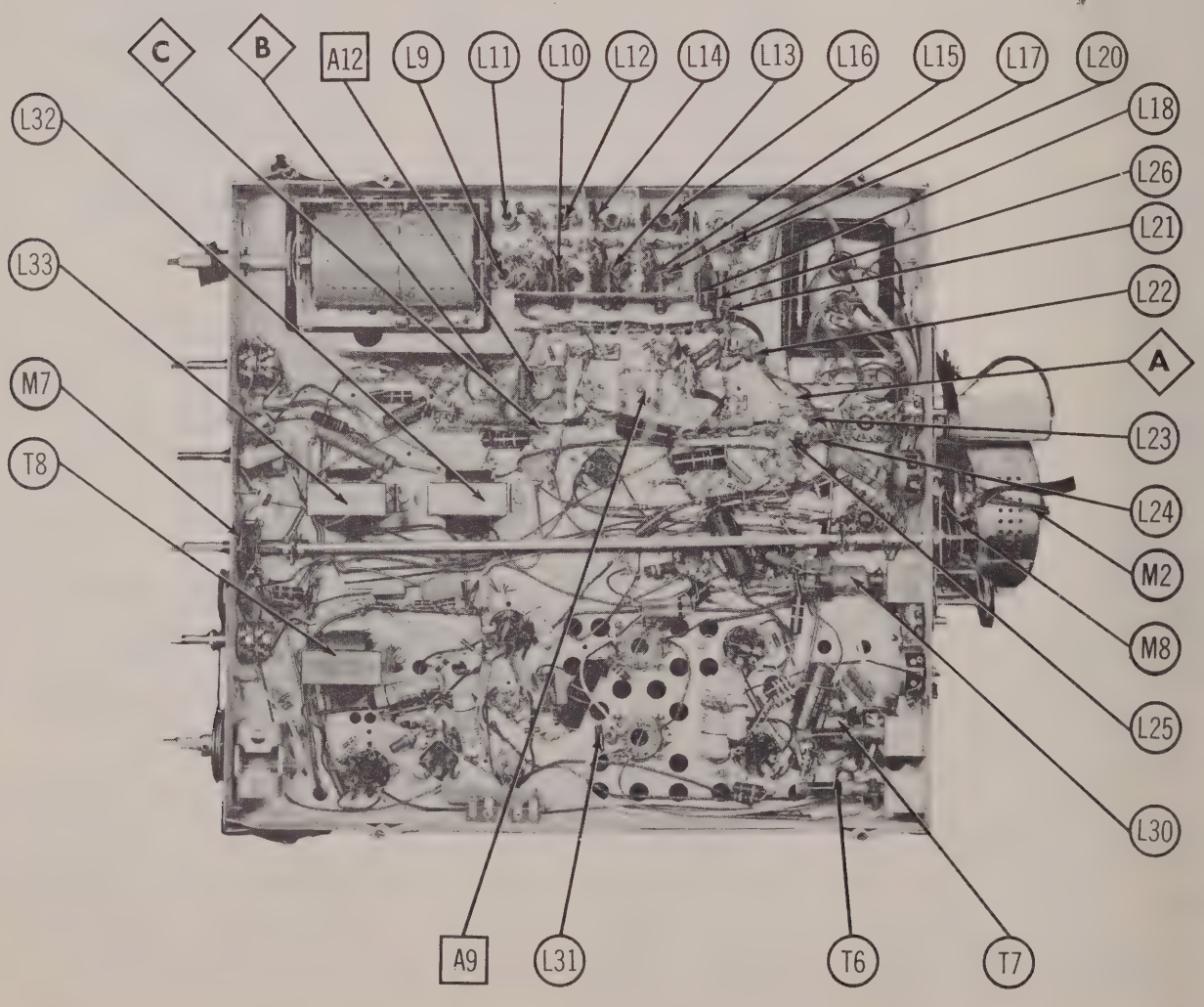
PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	SPARTON PART No.	NOTES
M3	Dial Light		VHF Indicator #47 bayonet
M4	Tuner	PC70021	UHF
M5	Tuner	PD93174-5	VHF
M6	Trap	PA5352	Antenna filter
M7	Switch	PB42013	UHF-VHF changeover front
M8	Switch	PB42014	UHF-VHF changeover rear
M9	Centering Magnet	PA1270	
M10	Ion Trap	PA1248-3	
M11	Correction Magnet	PA63119	(4) used
	Knob	PA5669-1	Vert.hold (inner shaft) Models 22312, 23322
	Knob	PA5669-2	Vert.hold (inner shaft) Models 22313, 23323
	Knob	PA5670-1	Brigheness (inner shaft) Models 22312, 23322
	Knob	PA5670-2	Brightness (inner shaft) Models 22313, 23323
	Knob	PA5671-1	Off/On/Volume (inner shaft) Models 22312, 23322
	Knob	PA5671-2	Off/On/Volume (inner shaft) Models 22313, 23323
	Knob	PA5660-1	(3) horiz.hold, contrast, tone (outer Shaft) Models 22312, 23322
	Knob	PA5660-2	(3) horiz.hold, contrast, tone (outer shaft) Models 22313, 23323
	Knob	PA5672-1	UHF-VHF selector Models 22312, 23322
	Knob	PA5672-2	UHF-VHF selector Models 22313, 23323
	Knob	AB43085-1	UHF fine tuning Models 22312, 23322
	Knob	AB43085-2	UHF fine tining Models 22313, 23323
	Knob	PB40363-1	VHF fine tuning Models 22312, 23322
	Knob	PB40363-2	VHF fine tuning Models 22313, 23323
	Knob	AB43086-1	UHF channel indicator Models 22312, 23322
	Knob	AB43086-2	UHF channel indicator Models 22313, 23323
	Knob	AB43593-1	VHF channel indicator Models 22312, 23322
	Knob	AB43593-2	VHF channel indicator Models 22313, 23323
	Safety glass	PB40354-3	



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

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POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V27 and V28. Check B+ filter and decoupling network components.

SMALL AND/ OR DIM PIX

Substitute V27 and V28. Check B+ filter and decoupling components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V21, V22, V23, V24, V25, and V26. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check R120, R121, C100, C95, R111, R112, T3, T5A and other associated components.	Check C91, C92, C93, C94, R99, R100, R102, R104, L30 and associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V21, V22, V23, V24, V25, V26, and V28. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V21, V22, V23, V24, V25 and V26. Check R120, R121, C100, C95, R111, R112, T3, T5A, picture tube and other associated circuit components for failure or change of value.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss of Video".

RASTER NO SOUND NO PIX (VHF)

Check by substitution V3, V4, V5, V6, V7, V8 and V9. Check associated components.

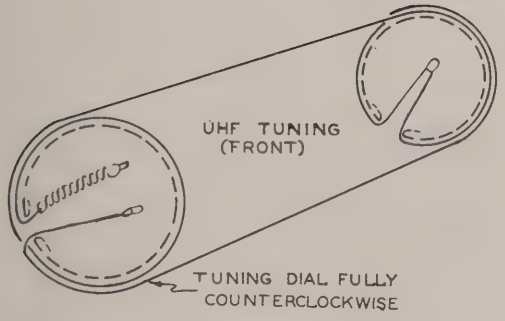
RASTER NO SOUND NO PIX (UHF)

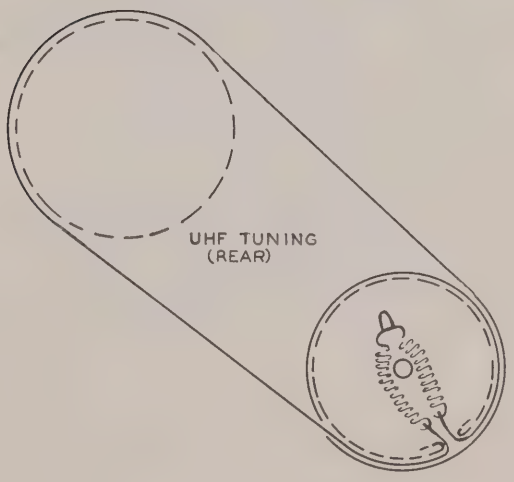
Check UHF-VHF switch position. Check V1 and V2 by substitution.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing. Check video signal for interference pulses.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.





UHF DRIVE CORD STRINGING

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

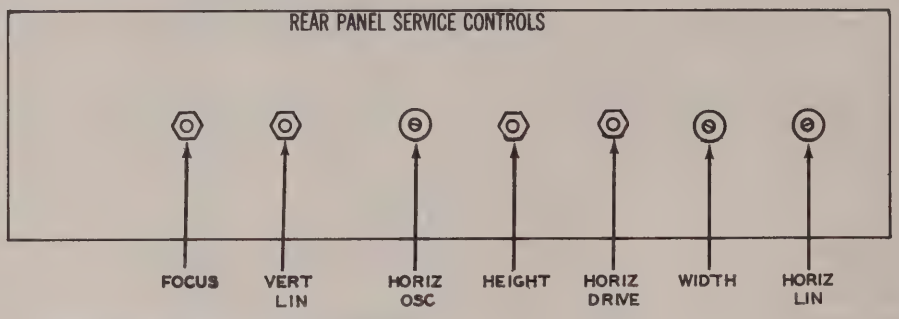
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove four wood screws holding metal strip at bottom of safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator slug (L30) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L29) located on the bottom of of chassis. (Screen removable from bottom) (See tube placement chart).

FUSES

One fuse is used for horizontal sweep circuit protection. (For location, see tube placement chart.

CENTERING

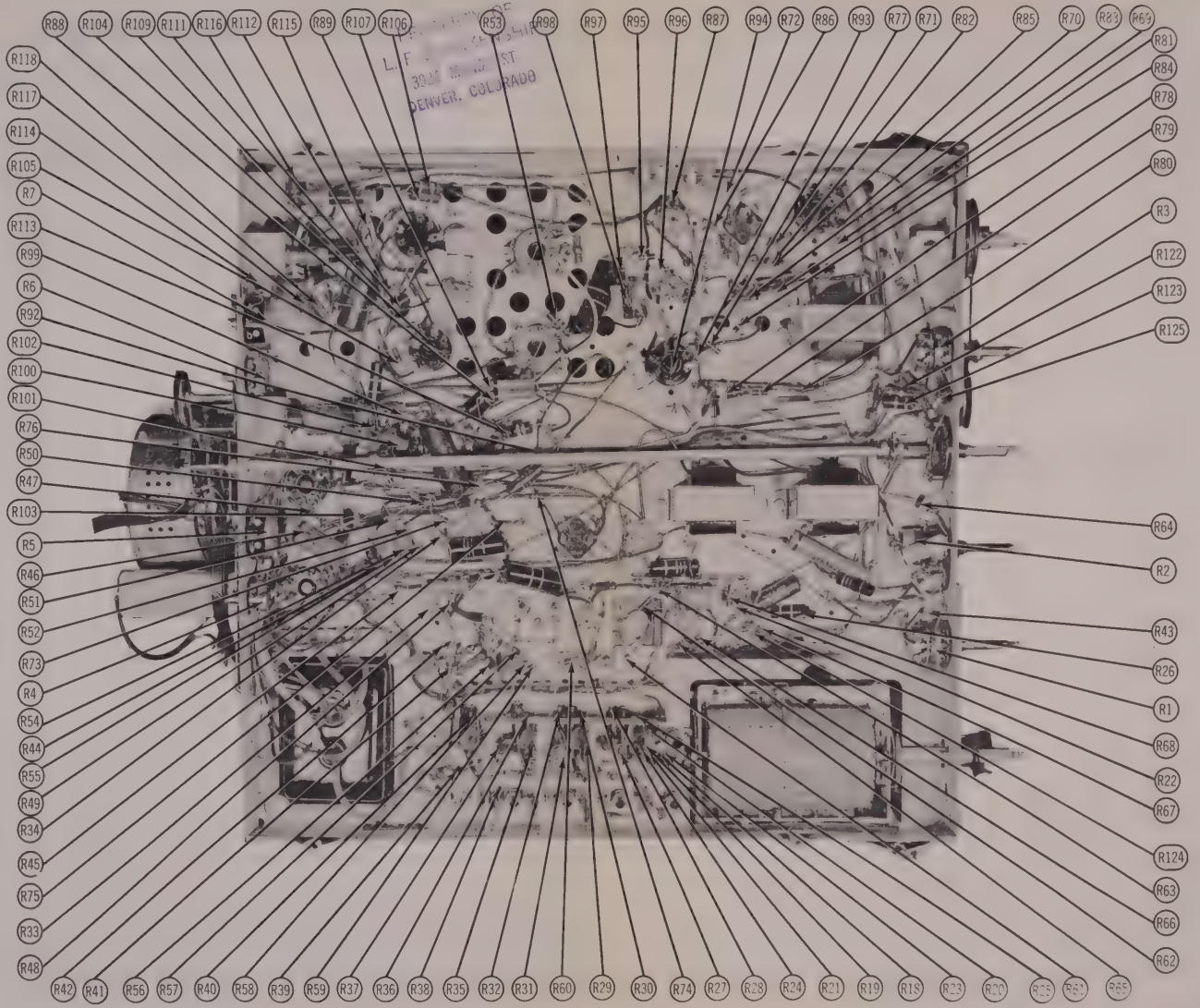
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke . Rotate the two raings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

With the height and width controls reduce the size of the picture until the sides of the raster are visible. Adjust the corrector magnets until the opposite sides of the picture are straight and parallel.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Disconnect built-in antennas, speaker leads,.
3. Remove 6 wood and 1 metal screws. Remove rear cover.
4. Remove 4 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

RETMA MEMBER

TRUETONE
MODEL 2D1352A

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MODEL 2D1352A

TRUETONE
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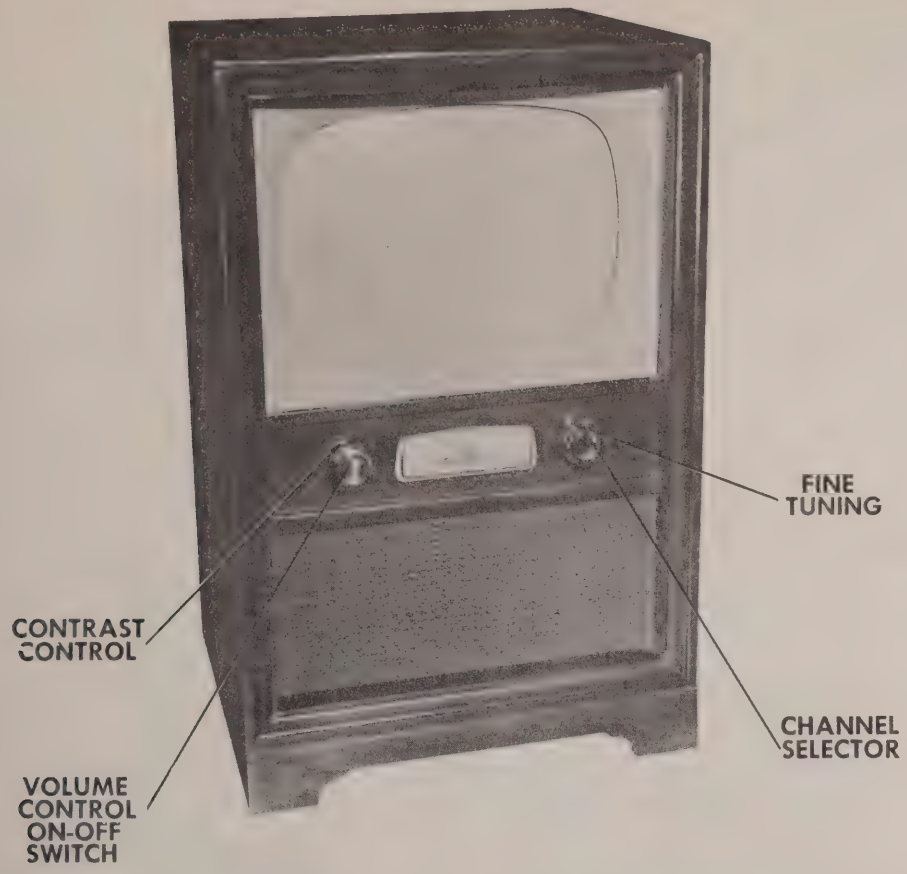

TRUETONE
MODEL 2D1352A

TRADE NAME	Truetone Model 2D1352A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC — RATING 1.54 Amp. @ 117 Volts AC
TUNING RANGE—	Channel 2 thru 13, Video IF 26.6MC, Sound IF 22.1MC (Intercarrier)

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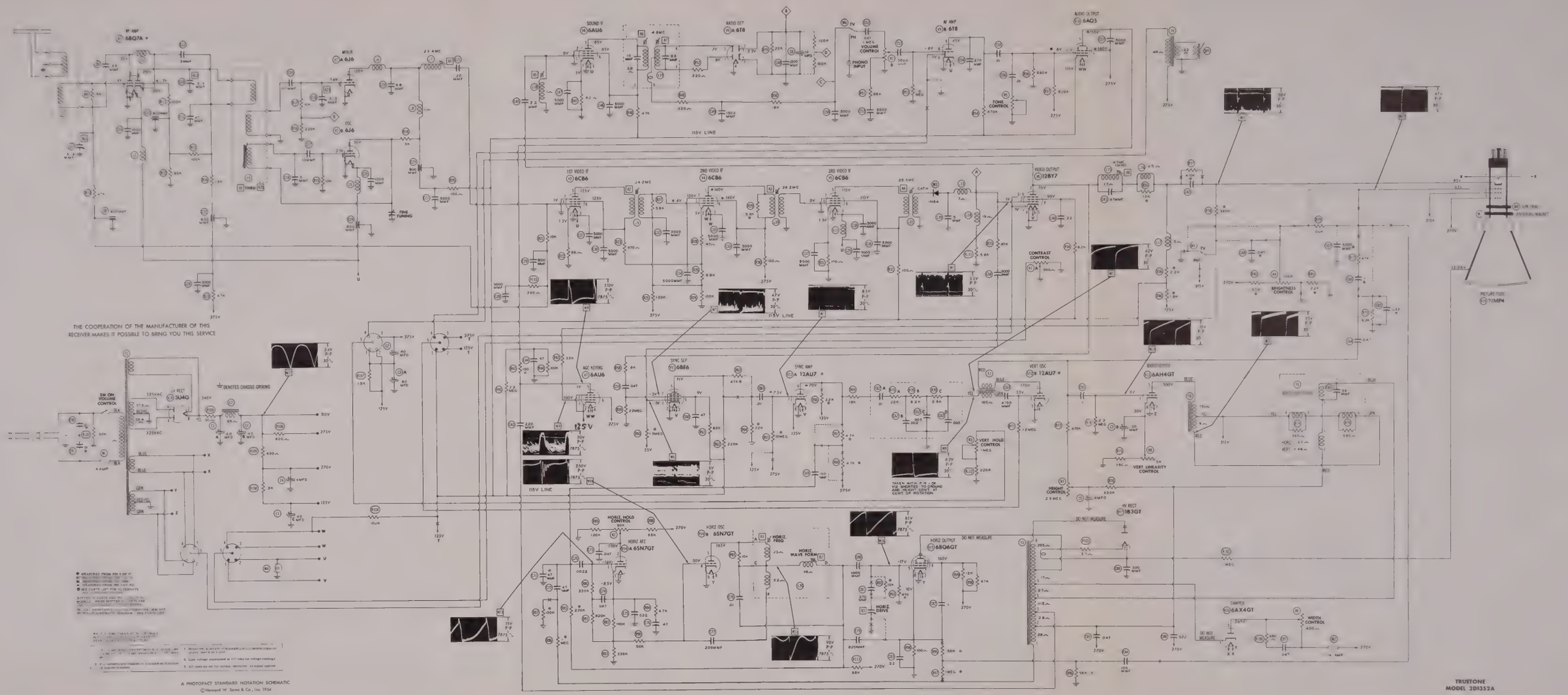
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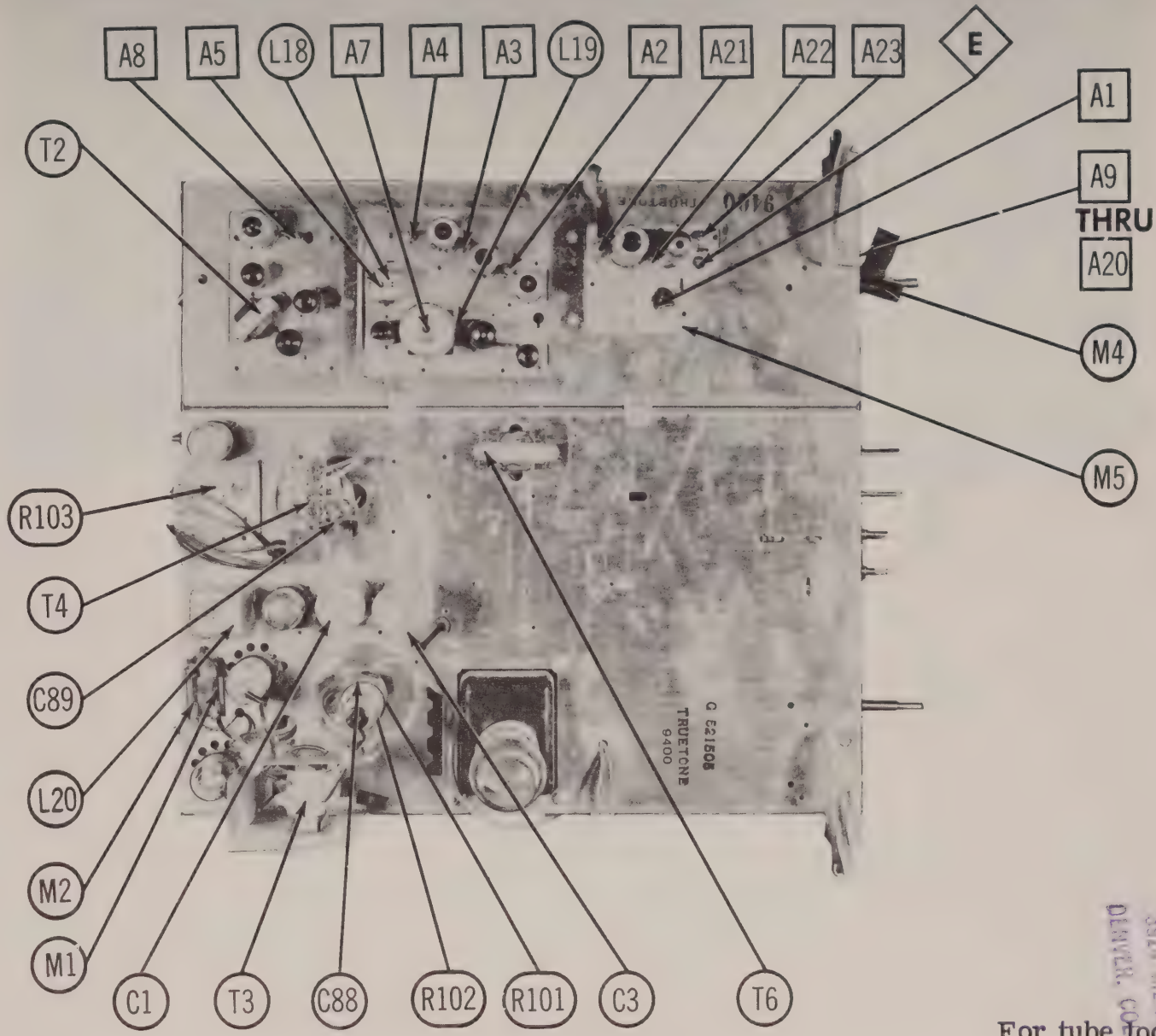
TRUETONE MODEL 2D1352A



CHASSIS TOP VIEW

For tube location see tube placement chart page 5.

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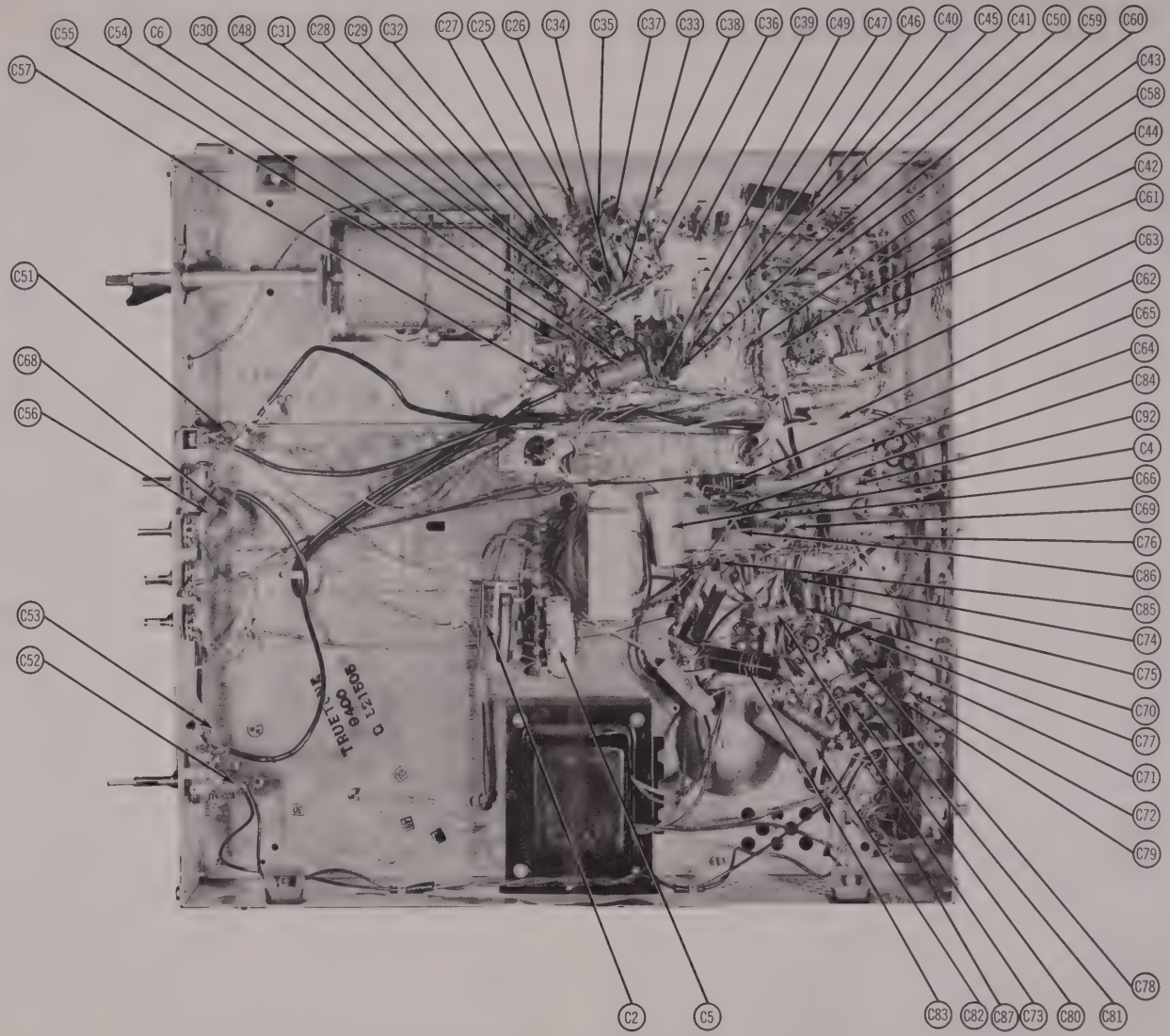
MODEL 2D1352A



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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TUBE PLACEMENT CHART

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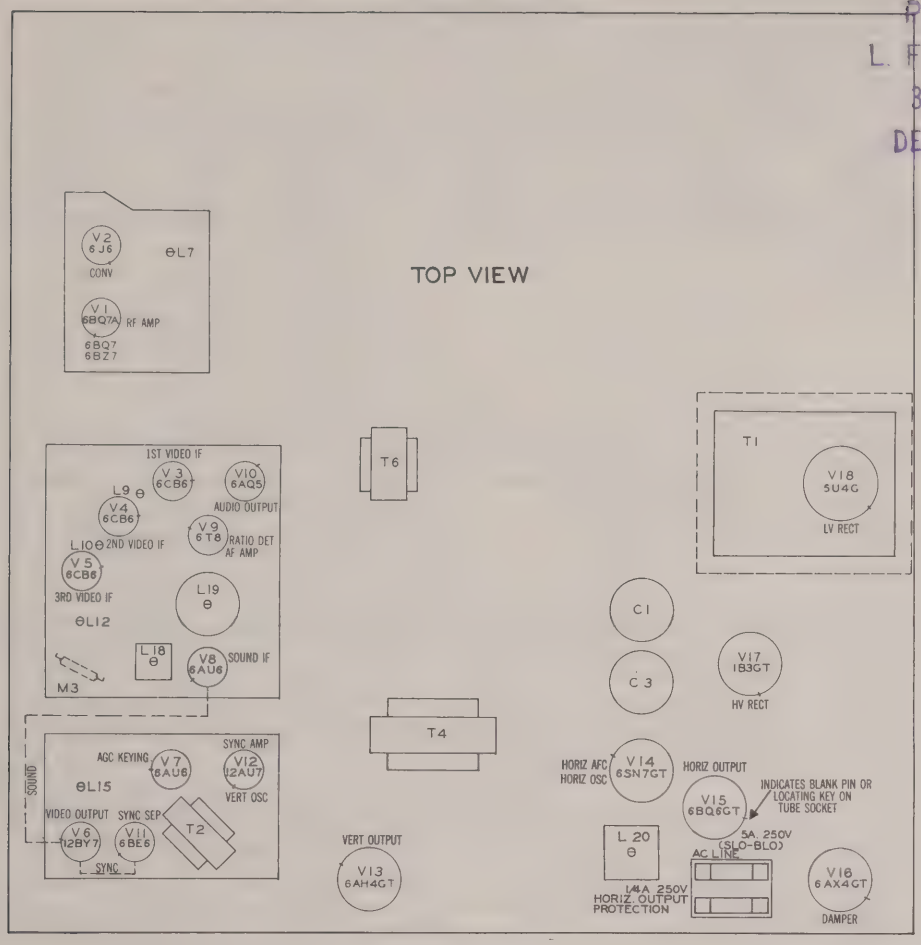

TRUETONE
MODEL 2D1352A

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V10
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V19
Has pic, no sound - V8, V9, V10
Overloaded picture -V7

SYNC FAILURE
No vert. sync - V12
No horiz. sync - V12, V14
No vert. or horiz. sync - V11, V12

SWEEP FAILURE
No raster, has sound -V14, V15, V16, V17, V19 Fuse (M2)
No vertical deflection - V12, V13
Poor vert. linearity or foldover - V12, V13
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18, V19
Vert. off freq. -V12
Horiz. off freq. - V12, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V14).

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C44. Connect the positive lead to chassis.
Use Truetone IF alignment tool #507479 (or equivalent).
When the IF channel is badly misaligned, two or more stages may break into oscillation as evidenced by excessive voltage at point (A). This voltage will be unaffected by strength of signal from the generator. In such cases the condition may generally be corrected by detuning the IF coils in a different direction. If the oscillation persists increase the AGC bias from -3 volts to -4.5 volts. Once the stages have been aligned and become stable reduce the fixed bias to -3 volts and repeat the IF alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.4MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	24.2MC	"	"	A2	"
3.	"	"	26.2MC	"	"	A3	"
4.	"	"	25.4MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to an ungrounded tube shield floating over dummy coverter tube. Low side to chassis.	25MC (10MC Swp)	22.1MC 26.6MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Set contrast control ot its fully counter clockwise position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A5, A6	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point (C). Common to point (D).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C6. Adjust for curve of maximum amplitude and symmetry as in fig.2.
7.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A7	Reconnect stabilizer capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig.3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig4). Common to chassis.	A8	Adjust for MINIMUM deflection.

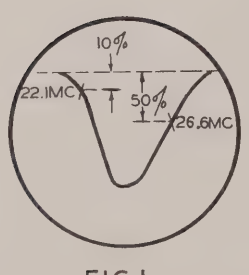

FIG.1

FIG.2

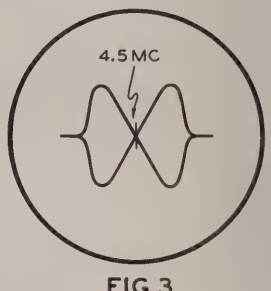

FIG.3

ALIGNMENT INSTRUCTIONS (cont)

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3924 MEADE ST.
DENVER, COLORADO

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel. Leave bias supply connected as under video IF alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms .
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon resistors	Across antenna termin terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. to point (A). Low side to chassis.	A9	Adjust to place sound marker as shown in Fig. 5. Video marker should be at 50%.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A10	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A11	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Leave bias supply connected as under Video IF alignment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A21, A22 A23	Adjust for response curve similar to Fig. 6 with markers above 90% .
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel make slight compromise adjustments of A21, A22 and A23, with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

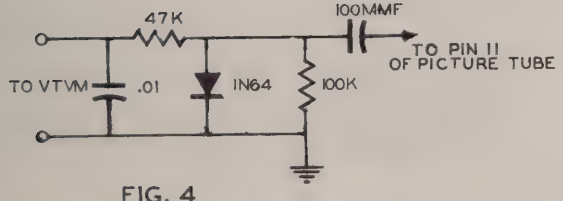


FIG. 4

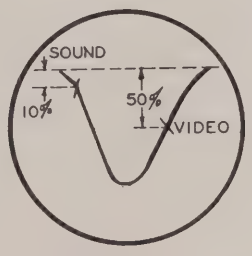


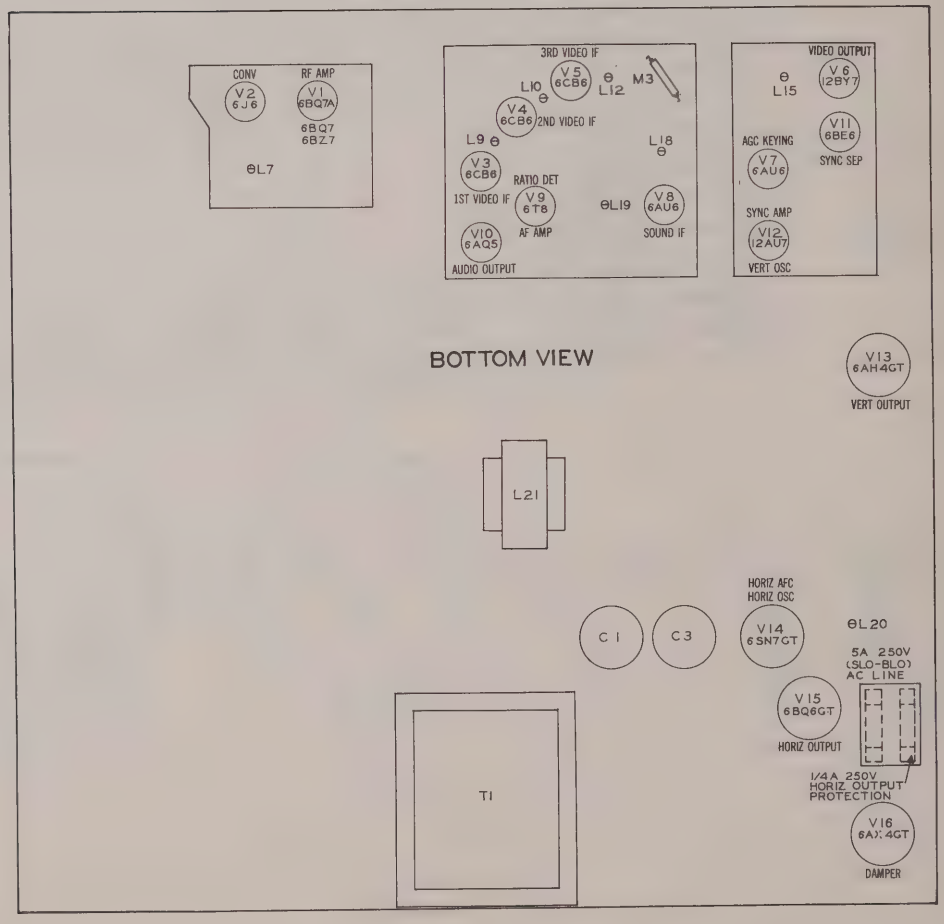
FIG. 5

FIG. 6

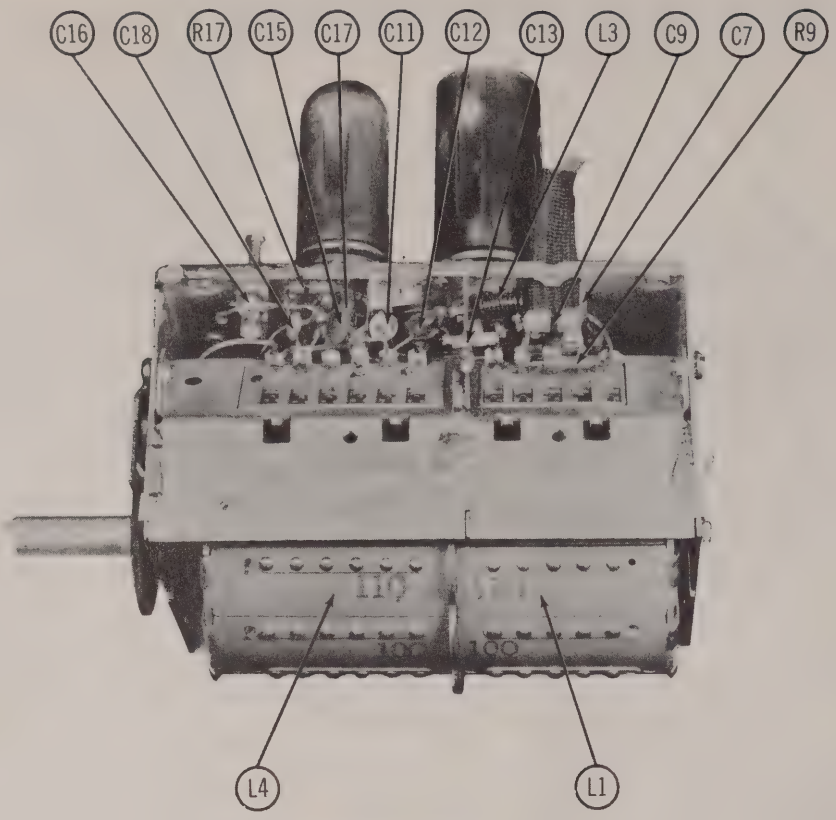
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	150KΩ	0Ω	.1Ω	0Ω	†6.9KΩ	†200KΩ	INF	0Ω
V 2	6J6	†32KΩ	†17KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	110KΩ	68Ω	.1Ω	0Ω	†130KΩ	†130KΩ	0Ω		
V 4	6CB6	†120KΩ	†128KΩ	†115KΩ	†115KΩ	†800Ω	†800Ω	107KΩ		
V 5	6CB6	.5Ω	100Ω	.1Ω	0Ω	■100Ω	■100Ω	0Ω		
V 6	12BY7	55Ω	5.6KΩ	55Ω	0Ω	0Ω	.1Ω	†20KΩ	■8.2KΩ	55Ω
V 7	6AU6	†50KΩ	†15KΩ	†115KΩ	†115KΩ	200KΩ	†770Ω	†15KΩ		
V 8	6AU6	1Ω	0Ω	.1Ω	0Ω	■4.7KΩ	■4.7KΩ	82Ω		
V 9	6T8	INF	22KΩ	INF	0Ω	.1Ω	100KΩ	0Ω	10Meg	■470KΩ
V 10	6AQ5	350KΩ	†12KΩ	†115KΩ	†115KΩ	†1KΩ	†700Ω	350KΩ		
V 11	6BE6	†1.5Meg	0Ω	.1Ω	0Ω	■220KΩ	■82KΩ	2.2Meg		
V 12	12AU7	#2Meg	2Meg	0Ω	0Ω	0Ω	†9KΩ	†10Meg	†15KΩ	.1Ω
V 13	6AH4GT	2.2Meg	0Ω	†115KΩ	2.2Meg	†850Ω	†115KΩ	.1Ω	1.8KΩ	
V 14	6SN7GT	1.8Meg	†65KΩ	430KΩ	480KΩ	†68KΩ	0Ω	.1Ω	0Ω	
V 15	6BQ6GT	†500Ω	.1Ω	INF	†12KΩ	470KΩ	†68KΩ	0Ω	100Ω	TOP CAP #17Ω
V 16	6AX4GT	INF	†1.2KΩ	600KΩ	†500Ω	†550Ω	†500Ω	†115KΩ	†115KΩ	
V 17	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP #412Ω
V 18	5U4G	INF	40KΩ	INF	35Ω	INF	37Ω	INF	40KΩ	
V 19	21MP4	†115KΩ	†250KΩ	PIN 6 †500Ω	PIN 10 †100Ω	PIN 11 †330KΩ	PIN 12 †115KΩ			

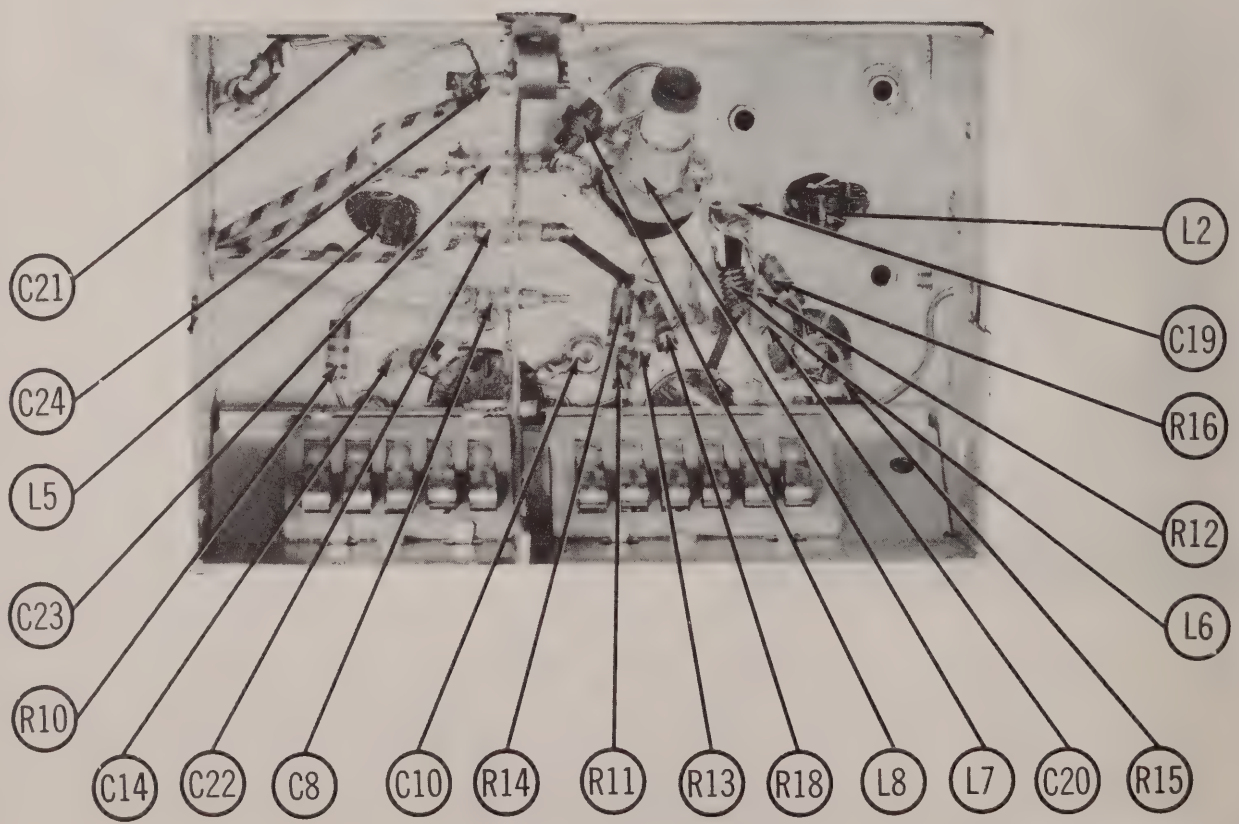
† MEASURED FROM PIN 8 OF V18
# MEASURED FROM PIN 3 OF V16
■ MEASURED FROM 115V LINE



TUBE PLACEMENT CHART

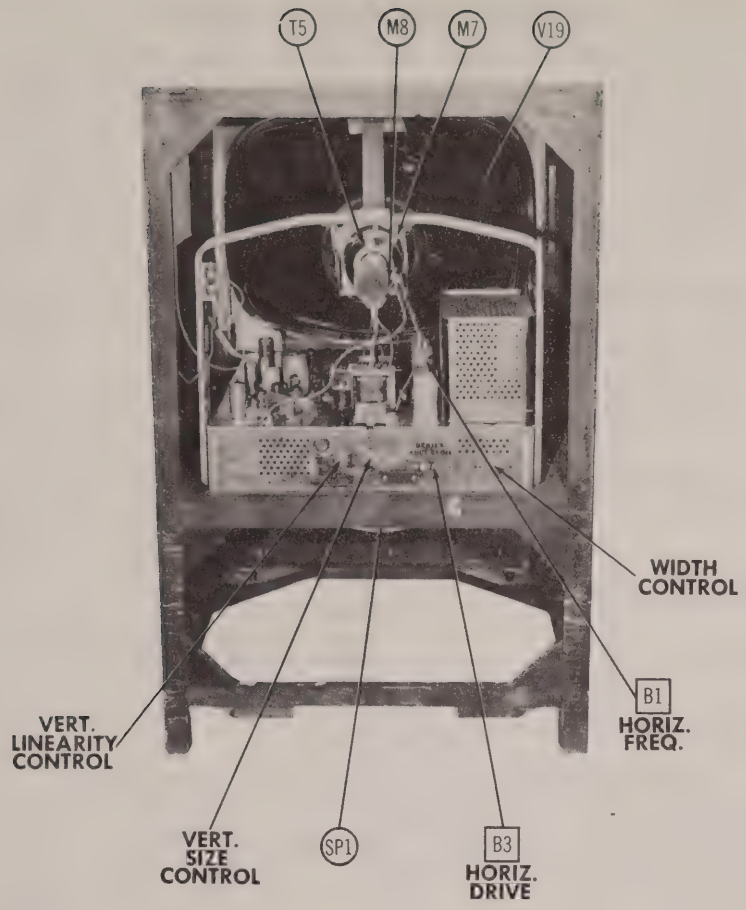


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

PROPERTY OF
L. F. BLANKENSHIP
3924 ALMIRE ST
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

The following adjustments are for receivers that do not include the letter "Q" in the series designation on the rear of the chassis:

1. Set the horizontal hold control fully counter clockwise.
2. Adjust the horizontal frequency slug (B1) fully counter clockwise then in a clockwise direction until the picture is just ready to pull into sync.
3. With horizontal hold control near its mid-range position, picture should hold sync while switching off channel and back again. At the extreme settings of the horizontal hold control the picture should lose sync when switching off channel and back again.
4. If the horizontal circuit does not respond as in step 3, adjust the horizontal drive trimmer (B3) counter clockwise as far as possible. without the presence of vertical white lines or compression near the center of the picture.
5. Repeat steps 1, 2 and 3. If picture still fails to sync properly continue with step 6.
6. Adjust B1 and B2 to their maximum counter clockwise positions.
7. Short together terminals "C" and "D" of L20 and set horizontal hold control fully counter clockwise.
8. Adjust B1 until picture just locks in horizontally. Remove short from terminal "C" to "D" of L20. If picture loses sync, adjust B2 clockwise until picture syncs.
9. Connect the vertical amplifier of an oscilloscope to terminal "C" of L20. Connect low side to chassis. Adjust B2 for wave form shown in Fig. 7. If necessary, simultaneously adjust the horizontal hold control to keep the picture in sync while adjusting B2.
10. With horizontal hold control set to its maximum counter clockwise position, adjust B1 until locks in and does not lose sync when switching off channel and back again then turn B1 slowly counter clockwise until picture just begins to lose sync. Check for circuit stability as in step 3.

Adjust the width control for a picture slightly wider than necessary to fill the picture mask horizontally.

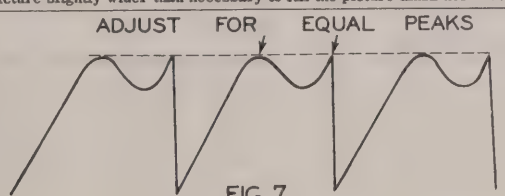


FIG. 7

SET 232 FOLDER 9

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V14, V15, V16 and V18. Check adjustment of the width control and B3. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check C82, C85, C86, R98, R99, T3, T5A and other associated components.	Check C77, C78, C79, C80, L20, R93, R113 and other associated circuit components.

DRIVE LINES

Check by substitution V14, V15 and V16. Check adjustment of the horizontal drive (B3). Check C79, C80, C81, C85, C86, T3, T5A and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V14, V15 and V16. Check horizontal output and damper circuit components especially T3 and T5A for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V15 and V16. Check associated circuit components.

XMAS TREE EFFECT

Substitute V14. Check L20, C77, C78, C79, C80 and other associated components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V12 and V13. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R75, R8 and other associated circuit components.	Check C64, C92, R72, R74, R76 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V12 and V13. Check C3B, T4, T5B and other associated components for failure or change of value.

COMPRESSED AT TOP

Check by substitution V12 and V13. Check associated circuit components especially C92 and R74.

FOLDS

Check by substitution V12 and V13. Check associated circuit components, including T4 and T5B for failure or change of value.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V11 and V12. Check components associated with V11 and V12A, especially C59 and C61.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V11 and V12. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V12B.	Check components associated with V11 and V12A especially C62.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V14. Check associated components especially C77, C78, C79, C80, L20 and R90.

HORIZONTAL BENDING

Substitute V14 and V15. Check circuit near these stages for filament lead dress shorts. Check C75 and C76.

VIDEO

LOSS OF VIDEO

Check C42, R38, picture tube and other associated circuit components.

SOUND BARS (4.5MC BEAT)

Check tuner fine tuning adjustment. Check 4.5MC trap adjustment, A8. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video detector crystal and assembly. Check picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V6 and V7. Check video detector assembly. Check AGC network components. Check picture tube and other associated components.

SMEAR

Substitute V6. Check video detector assembly. Check C42, R34, R36, R37, R38, L16, L17, picture tube and other associated circuit components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V1, V2, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9B and V10 using audio signal generator. Apply audio signal across R53.

If Satisfactory	If Unsatisfactory
Check audio IF and ratio detector alignment and components.	Check components associated with V9B and V10 especially C55.

BUZZ

Adjust fine tuning for best sound and picture. Adjust A7 for minimum buzz. If still objectionable substitute V9 and realign audio IF and ratio detector stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST AND DESCRIPTIONS

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1A	RF Amplifier	6BQ7A	6BQ7A	9AJ	
B	RF Amplifier	6BQ7	6BQ7	9AJ	
C	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	AGC Keying	6AU6	6AU6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V10	Audio Output	6AQ5	6AQ5	7BZ	
V11	Sync Separator	6BE6	6BE6	7CH	
V12A	Sync Amplifier - Vert. Oscillator	12AU7	12AU7	9A	
B	Sync Amplifier - Vert. Oscillator	12AT7	12AT7	9A	
V13	Vert. Output	6AH4GT	6AH4GT	8EL	
V14	Horiz. AFC - Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V16	Damper	6AX4GT	6AX4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	21MP4	21MP4	21MP4	21MP4	12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	508072	AFH3-44		CO35		FP377	TVL-3787	
B	▲40	450								
C	■40	450								
C2	40	300	160095	PRS450/40		BR4035		TC78	TVA-1611	
C3A	▲80	250	509002	AFH3-142		C109		FP375	TVL-3722	
B	▲100	50								
C4	4	450	504719	PRS450/4		BR445		TC70	TVA-1702	
C5	4	450	504719	PRS450/4		BR445		TC70	TVA-1702	
C6	10	150	505174	PRS150/12		BR1015		TC42	TVA-1402	
C7	3-9		509064		829-10					
C8	800			EF-001	MFT-1000				503C-D1	
C9	3.6		520721							
C10	.5-3		507968		829-3			CT565A		
C11	47		520719	BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C12	1.5		520720	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C13	800			EF-001	MFT-1000				503C-D1	
C14	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C15	100			BPD-0001	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C16	.5-3		507968		829-3			CT565A		
C17	10		520718	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C18	5		520717							
C19	6.8		520716	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C20	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C21	120		513029	BPD-00012	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C22	800			EF-001	MFT-1000				503C-D1	
C23	800			EF-001	MFT-1000				503C-D1	
C24	800			EF-001	MFT-1000				503C-D1	
C25	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C26	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C27	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C28	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C29	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C31	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C32	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C33	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C36	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C37	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C38	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C39	5		513432	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C40	.22	200	512238	P488-22		PTE4P22		PT4025	4TM-P22	
C41	47		513438	SI47NP0	TCZ-47		NP0K-470	ZT-5447	5TCC-Q47	
C42	.1	200	512216	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C43	220	1000	513032	HVD15-00022					10GA-T22	
C44	.47	200	512239	P288-47		PJ2P5		PT405	2TM-P47	
C45	2.2		513001	SI2.2NP0	TCZ-2.2		NP0K-2R2		5TCCB-V22	
C46	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C47	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C48	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C49	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C50	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C51	.047	200	512235	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C52	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C53	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C54	270		513006	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C55	.01	400	512205	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C56	.01	400	512205	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C57	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C58	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	

(CONT'D ON NEXT PAGE)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA TRUETONE Part No	AEROVOX Part No	CENTRALAB Part No	CORNELL DUBILIER Part No	ERIE Part No	MALLORY Part No	SPRAGUE Part No	NOTES
C59	.047	600	512235	P488-047	DF-503	PTK6S47		PT6147	6TM-S47	
C60	.47	200	512239	P288-47		PJ2P5		PT405	2TM-P47	
C61	.01	400	512205	P488-01	D6-103	PTK4S1	GP2-333-103	PT411	4TM-S1	
C62A	.01					PTK6S1		PT611		
B	.002		●508062	BPD-01	◆ DD-103	PTK6D2	▲ 811-01	PT632	◆ 5HK-S1	
C	.005			PA-110	PC-100	PTK6D5	1405-01	PT625	101C1	
D	.005					PTK6D5		PT635		
C63	4700	1000	512533							
C64	.047	400	512236	P488-047		PTK4S47		PT4147	4TM-S47	
C65	.033	200		P488-033						
C66	.1	200		P288-1	DF-104	PJ2P1		PT401	2TM-P1	Note 1
C67	5000		513013	BPD-005	DD-502	TM5D5	811-005	DC-535	5HK-D5	Note 1
C68	.047	400	512235	P488-047	DF-503	PTK4S47		PT4147	4TM-S47	
C69	100	500	512502	1469-0001		SR5T1		MCB235	MB-S1	
C70	.0022	400	512232	P488-0022	D6-222	PTK6D22	GP2-333-222	PT6222	6TM-D22	
C71	.01	1000	513030	HVD15-000047		TM10Q47			10GA-Q47	Note 3
C72	.47	1000	513030	HVD15-000047		TM10Q47			10GA-Q47	
C73	.047	400	512236	P488-047	DF-503	PTK4S47		PT4147	4TM-S47	
C74	.047	200	512235	P488-047	DF-503	PTK4S47		PT4147	4TM-S47	
C75	.022	400	512233	P488-022		PTK4S22		PT4122	4TM-S22	
C76	47	200	512239	P288-47		PJ2P5		PT406	2TM-P47	
C77	200		512427							
C78	.01	400	512205							
C79	820	500	512547		SU1000	D6-102	TM5D1	GP2L-102	UC-531	5HK-D1
C80	1000		513009			TCN-270		M750L-271		
C81	270									
C82	.1	600	512218	P688-1		PTE6P1		PT601	6TM-P1	
C83	.22	200	512238	P488-22		PTK4P22		PT4025	4TM-P22	
C84	100	500		1469-0001		SR5T1		MCB235	MB-S1	
C85	.047	600	512237	P688-047		PTE6S47		PT6147	6TM-S47	
C86	.022	600	512234	P688-022		PTE6S22		PT6122	6TM-S22	
C87	.047	200	512235	P488-047		PTK4S47		PT4147	4TM-S47	
C88	500	20000	520990	HV20C	TV3-502	MM-C3072	413-502	HV30035A	20DK-T5	
C89	56	1500	513027						30GA-Q56	
C90	.01	600	512206	6892X-01		P2S81		PT611	6TM-S1	Note 1
C91	.01	600	512206	6892X-01		P2S81		PT611	6TM-S1	Note 1
C92	5+1	600	512218	P688-1	DY-104	PTE6P1		PT601	6TM-P1	

Note 1. Not used in all Models.
Note 2. Some Models use a 10-160MMF variable capacitor in this application (part #530990).
This unit is part of a dual trimmer assembly.
◆ Items C61A, C61B, C61C, C61D, R70A, R70B, R70C are combined in one unit.
† Install BPD-01 in series with PA-110 input lead to replace original unit.
‡ Install DD-103 in series with PC-100 input lead to replace original unit.
* Install 811-01 in series with 1405-01 input lead to replace original unit.
▲ Install 5HK-S1 in series with 101C1 input lead to replace original unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA TRUETONE Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	300Ω	½	521288	* QJ-517			UF32	Contrast Panel
B	1MEG	½	Not Reg.				UR16-T25 †	Volume rear tapped at 230K
C	Switch		Not Reg.				UR-28	Attach to R1A
R2A	50KΩ	½	521059	Q11-123	AG-44-8	AB-31	U-35	Horiz. Hold
B	Shaft		Not Reg.	Not Reg.	KS8-3	AK-4	Not Reg.	Attach to R2A
R3A	1MEG	½	521038	Q11-137	AG-61-8	AB-69	U-54	Vert. Hold
B	Shaft		Not Reg.	Not Reg.	KS8-3	AK-4	Not Reg.	Attach to R3A
R4A	100KΩ	½	509693	Q11-128	AG-49-8	AB-40	U-41	Brightness
B	Shaft		Not Reg.	Not Reg.	RS-3/16	AK-4	Not Reg.	Attach to R4A
R5A	500KΩ	½	520651	Q11-133	AG-58-8	AB-59	U-50	Tone
B	Shaft		Not Reg.	Not Reg.	KS8-3	AK-4	Not Reg.	Attach to R5A
R6A	600Ω	4	520996	4WK-600	AU-600	SVP-591	M600P	Width wire wound
B	Shaft		Not Reg.	Not Reg.	FKS-1/4	Not Reg.	Not Reg.	Attach to R6A
R7A	2.5MEG	½	520944	Q11-239	AG-94-8	AB-83	SU-565	Vert. Size
B	Shaft		Not Reg.	Not Reg.	FKS-1/4	AK-1	Not Reg.	Attach to R7A
R8A	5000Ω	½	520945	Q17-114	AG-19-8	AB-12	SU-14	Vert. Linearity
B	Shaft		Not Reg.	Not Reg.	FKS-1/4	AK-1	Not Reg.	Attach to R8A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE Part No	IRC Part No.	NOTES
R9	15KΩ	1	510157	BTS-15K	
R10	47KΩ	1	510167	BTS-47K	
R11	100KΩ	1	510172	BTS-100K	
R12	160KΩ	1	510774	BTS-160K 5%	
R13	100KΩ	1	510772	BTS-100K 5%	
R14	1500Ω	1	510139	BTS-1500	
R15	10KΩ	1	510154	BTS-10K	
R16	220KΩ	1	510179	BTS-220K	
R17	10KΩ	1	510154	BTS-10K	
R18	15KΩ	1		BTS-15K	
R19	4700Ω	2	510348	BTS-4700	
R20	100Ω	1	510118	BTS-100	
R21	10KΩ	1	510154	BTS-10K	
R22	68Ω	1	510116	BTS-68	
R23	470Ω	1	510130	BTS-470	
R24	100KΩ	1	510172	BTS-100K	
R25	120KΩ	1	510174	BTS-120K	
R26	6800Ω	1	510151	BTS-6800	
R27	5800Ω	1	510150	BTS-5800	
R28	47Ω	1	510113	BTS-47	
R29	5800Ω	1		BTS-5800	Note 1
R30	100Ω	1	510118	BTS-100	
R31	100Ω	1	510118	BTS-100	
R32	100Ω	1	510118	BTS-100	
R33	47KΩ	1	510166	BTS-47K	
R34	8200Ω	1	510153	BTS-8200	
R35	12KΩ 5%	1		BTS-12K 5%	Note 1
R36	2300Ω	1		BTA-2300	Note 2
R37	470KΩ	1		BTS-470K	Note 2
R38	560KΩ	1		BTS-560K	Note 4
R39	100KΩ	1	510172	BTS-100K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE Part No	IRC Part No.	NOTES
R40	100KΩ	1	510172	BTS-100K	
R41	22KΩ	1	510160	BTS-22K	Note 6
R42	33KΩ	1	510163	BTS-33K	
R43	100KΩ	1	510172	BTS-100K	
R44	100KΩ	1	510172	BTS-100K	
R45	3.3MEG	1	510701	BTS-3.3MEG	
R46	1800Ω	1		BTS-1800	Note 7
R47	22Ω	1		BTS-22	
R48	4700Ω	1	510349	BTA-4700	
R49	220Ω	1	510134	BTS-220	
R50	10MEG	1	510159	BTS-10M	
R51	68KΩ	1	510169	BTS-68K	
R52	220Ω	1	510124	BTS-220	
R53	10MEG	1	510107	BTS-10Meg	
R54	470KΩ	1	510184	BTS-470K	
R55	22KΩ	1	510160	BTS-22K	
R56	560KΩ 5%	1	510778	BTS-560K 5%	
R57	820KΩ 5%	1	510747	BTS-820K 5%	
R58	18KΩ	1	510169	BTS-18K	
R59	2.2MEG	1	510183	BTS-2.2Meg	
R60	1.5MEG	1		BTS-1.5Meg	Note 8
R61	82KΩ	1	510171	BTS-82K	
R62	220KΩ	1	510178	BTS-220K	
R63	47KΩ	1	510166	BTS-47K	Note 3
R64	22KΩ	1		BTS-22K	Note 9
R65	10Meg	1		BTS-10Meg	Note 10
R66	22KΩ	1		BTS-22K	Note 3
R67	4700Ω	1		BTS-4700	Note 11
R68	4700Ω	1		BTS-4700	Note 3
R69	18KΩ	½	510159	BTS-18K	

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE Part No	IRC Part No.	NOTES
R70A	22KΩ			BTS-22K	
B	8200Ω		◆ 508062	BTS-8200	
C	8200Ω			BTS-8200	
R71	1.5MEG 5%	½	510777	BTS-1.5Meg 5%	
R72	470KΩ	½	510184	BTS-470K	
R73	82000Ω	½	510153	BTS-8200	
R74	2.2MEG	½	510183	BTS-2.2Meg	
R75	390Ω	½	510129	BTS-390	
R76	330KΩ	½	510181	BTS-330K	
R77	47KΩ	½		BTS-47K	Note 3
R78	560Ω	½	510132	BTS-560	
R79	560Ω	½	510132	BTS-560	
R80	330KΩ	½	510181	BTS-330K	
R81	820KΩ	½	510189	BTS-820K	
R82	100KΩ	1	510173	BTS-100K	
R83	330KΩ	1	510281	BTA-330K	
R84	4700Ω	½	510148	BTS-4700	
R85	220KΩ			BTS-220K	Note 12
R86	1MEG			BTS-1MEG	Note 13
R87	150KΩ			BTS-150K	Note 3
R88	68KΩ		510169	BTS-68K	
R89	120KΩ	1	510174	BTS-120K	
R90	150KΩ	½	510175	BTS-150K	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE Part No	IRC Part No.	NOTES
R91	10KΩ	1	510154	BTS-10K	
R92	10KΩ	1	510154	BTS-10K	Note 3
R93	470KΩ	1	510184	BTS-470K	
R94	100Ω	2	510318		
R95	150KΩ	½		BTS-150K	Note 3
R96	56KΩ	½		BTS-56K	Note 3
R97	1MEG	½		BTS-1Meg	Note 3
R98	47KΩ	1	510166	BTS-47K	
R99	12KΩ	2	510358	BTB-12K	
R100	680Ω	½	510134	BTS-680	
R101	5.3Ω	3	510735		
R102	1MEG	½	510190	BTS-1Meg	
R103	150KΩ	½	510176	BTS-150K	
R104	100KΩ	1	510172	BTS-100K	
R105	50Ω	5	510782	1 3/4A-50	
R106	600Ω	10	510741	1 3/4A-600	
R107	1500Ω	½	510139	BTS-1500	
R108	15KΩ	1	510357	BTS-15K	
R109	400Ω	10	510779	1 3/4A-400	
R110	390Ω	½	510129	BTS-390	
R111	5600Ω	½		BTS-5600	
R112	220KΩ	½		BTS-220K	
R113	68KΩ	1		BTA-68K	

◆ Items R70A, R70B, R70C C61A, C61B, C61C, C61D are combined in one unit.
Note 1. Some models may use a 15KΩ resistor in this application.
Note 2. Some models may use a 390Ω resistor in this application.
Note 3. Not used in all models.
Note 4. Some models may use a 10MEGΩ resistor in this application.
Note 5. Some models may use a 470KΩ resistor in this application.
Note 6. Some models may use a 470KΩ or a 330KΩ or no resistor in this application.
Note 7. Some models may use a 1500Ω resistor in this application.
Note 8. Some models may use a 820KΩ resistor in this application.
Note 9. Some models may use a 18KΩ resistor in this application.
Note 10. Some models may use a 1MEG resistor in this application.
Note 11. Some models may use a 6800Ω resistor in this application.
Note 12. Some models may use a 150KΩ resistor in this application.
Note 13. Some models may use a 330KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA TRUETONE Part No.	STANCOR Part No.	MERIT Part No.	Halldorson Part No.	TRIAD Part No.	RCA TYPE No.
T1	117VAC ⑨1.54A	650VCT .190ADC	5VAC ⑨ 3A	6.3VAC ⑨3.3A CHG 4 12.6VCT	520961					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA TRUETONE Part No.	STANCOR Part No.	MERIT Part No.	Halldorson Part No.	TRIAD Part No.	RCA TYPE No.	NOTES
T2	160Ω tap ⑨ 431.8Ω tap ⑨ 2.8Ω, 5.6Ω, 17.1Ω, 19.8Ω, 36.8Ω	980Ω 0Ω	520980 521066	A-8125	A-3003 HVO-9 ①②	B6702 FB41 ①③	A-97X D-19 ①	209T1 ⑤ 232T1 ⑤	Vert.Osc. Trans. Horiz.Output Trans.
T3	760Ω tap ⑨ 8Ω		520975 ④	A-8123 ⑤	A-3037 ⑤	Z1804 ⑤	A-102X ⑤	222T1 ⑤	Vert.Output Trans.
T5A	20Ω		520942	DY-8A ⑦⑧	MDF-72 ⑦	DY603 ⑦	Y-17 ⑦⑨	211D2 ⑦ ⑧	Horiz. Defl. Coils
B	48Ω		521267 ⑧		⑧	⑧			Vert.Defl. Coils

① Drill new mounting holes.
② Connect original terminal #7 to new terminal #9, original #6 to new #7, original #5 to new #5, original #3 to new "T", original #2 to new #3, original #1 to new #1.
③ Connect terminal #7 to terminal #8, then connect original terminal #7 to new terminal #9, original #6 to new #7 and #8, original #5 to new #5, original #3 to new "T", original #2 to new #3, original #1 to new #1.
④ Includes terminal strip and connectors for deflection yoke lead(part #521095).
⑤ Drill one new mounting hole.
⑥ Yoke cover and positioning device.
⑦ Use original yoke cover and positioning device.
⑧ Remove C89 from yoke terminal strip on top of vertical output transformers.
⑨ Connect original terminal #7 to new terminal #9, original #6 to new #8, original #5 to new #5, original #3 to new #4, original #2 to new "T" or #3, original #1 to new #1. If insufficient width, connect a .005MMF 600V capacitor across terminals "T" and #3.
⑩ Connect terminal #2 to terminal #3, then connect original terminal #7 to new terminal #10, original #6 to new #8, and original #5 to new #6. Original #3 to new #5, original #2 to new #3 and #3, original #1 to new #1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA TRUETONE Part No	STANCOR Part No.	MERIT Part No	Halldorson Part No	TRIAD Part No	NOTES
T6	5.1KΩ	3.9Ω	419Ω	1.22Ω	509376	A-3877	A-3930	Z1107	S-2X	

① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA TRUETONE Part No.	JENSEN Part No.	QUAM Part No.	NOTES
SP1	6"X9"	PM	3.9Ω	508174	ST-810 Mod P8S-V	69A3	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE Part No	MEISSNER Part No	MERIT Part No.	MILLER Part No	NOTES
L1A	Ant. Coil	01CT	0Ω	520702				Channel 2
B	Ant. Coil	01CT	0Ω	520703				Channel 3
C	Ant. Coil	03CT	0Ω	520704				Channel 4
D	Ant. Coil	03CT	0Ω	520705				Channel 5
E	Ant. Coil	03CT	0Ω	520706				Channel 6
F	Ant. Coil	03CT	0Ω	520707				Channel 7
G	Ant. Coil	03CT	0Ω	520708				Channel 8
H	Ant. Coil	03CT	0Ω	520709				Channel 9
I	Ant. Coil	01CT	0Ω	520710				Channel 10
J	Ant. Coil	03CT	0Ω	520711				Channel 11
K	Ant. Coil	03CT	0Ω	520712				Channel 12
L	Ant. Coil	03CT	0Ω	520713				Channel 13
L2	Fil. Choke	0Ω		530518				
L3	Neutr. Coil	0Ω		530701				
L4A	RF. Mixer grid & osc. coils	0Ω		530722				Channel 2
B	RF. Mixer grid & osc. coils	0Ω		530723				Channel 3
C	RF. Mixer grid & osc. coils	0Ω		530724				Channel 4
D	RF. Mixer grid & osc. coils	0Ω		530725				Channel 5
E	RF. Mixer grid & osc. coils	0Ω		530726				Channel 6
F	RF. Mixer grid & osc. coils	0Ω		530727				Channel 7
G	RF. Mixer grid & osc. coils	0Ω		530728				Channel 8
H	RF. Mixer grid & osc. coils	0Ω		530729				Channel 9
I	RF. Mixer grid & osc. coils	0Ω		530730				Channel 10
J	RF. Mixer grid & osc. coils	0Ω		530731				Channel 11
K	RF. Mixer grid & osc. coils	0Ω		530732				Channel 12
L	RF. Mixer grid & osc. coils	0Ω		530733				Channel 13
L5	Fil. Choke	0Ω		520620				
L6	RF Choke	0Ω		520714				
L7	1st Video IF	.9Ω		530734				Includes core, core Part # 509062
L8	RF Choke	1Ω		530716				
L9	2nd Video IF	.3Ω	.5Ω	520977	17-1063	TV-116	6249	Less slug; slug Part # 507357
L10	3rd Video IF	.3Ω	.5Ω	520977	17-1064	TV-116	6250	Less slug; slug Part # 507357
L11	Fil. Choke	0Ω		507584	19-3001	TV-189	6175	.6 Microhenry
L12	4th Video IF	.4Ω	.7Ω	520979	17-1064	TV-116	6250	Less slug, slug Part # 507357
L13	Series Peak. Coil	7Ω		520620	19-3180	TV-184	6180	180 Microhenries
L14	Shunt. Peak. Coil	19Ω		520985	19-3660		4850	650 Microhenries
L15	4.5MC trap	1.7Ω		509503	20-1004	TV-151	1470	Truetone Part # includes C41 & slug; slug Part # 507357
L16	Series Peak. Coil	9.5Ω		520689	19-3180	TV-184	6180	180 Microhenries; Note 1
L17	Shunt. Peak. Coil	15Ω		509342	19-1923	TV-188	4648	396 Microhenries; Note 2
L18	Sound IF	10		509378			1470-A	
L19	Ratio Det.	3.8Ω	.8ΩCT	509706	17-3492	TV-115	1696	Tertiary windings .5Ω
L20	Horiz. Osc.	75Ω		520943	20-1402 *	TV-182 *	6183 *	Includes core, core part # 521064. Pri. tapped at .52Ω Horiz. wave form winding-.46Ω

Note 1. Some models may use Truetone Part # 520984 in this application.
Note 2. Some models may use Truetone Part # 520986 in this application.
* Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ~↓	REPLACEMENT DATA TRUETONE Part No.	STANCOR Part No	MERIT Part No	Halldorson Part No	TRIAD Part No
L21	190ADC	69Ω	3.36 Hy.	508341	C-2325		C5030	C-21X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA TRUETONE Part No FUSE	TRUETONE Part No HOLDER	LITTELFUSE Part No FUSE	LITTELFUSE Part No HOLDER	BUSS Part No FUSE	BUSS Part No HOLDER
M1	3AG S/B	4A 125V	530988	530989	313004 (3AG S/B-4A)	357002	MDX4	4402
M2	3AG	1/4A 250V	509713	530989	312.250 (3AG-1/4A)	357002	AGC 1/4	4402

TRUETONE
MODEL 2D1352A

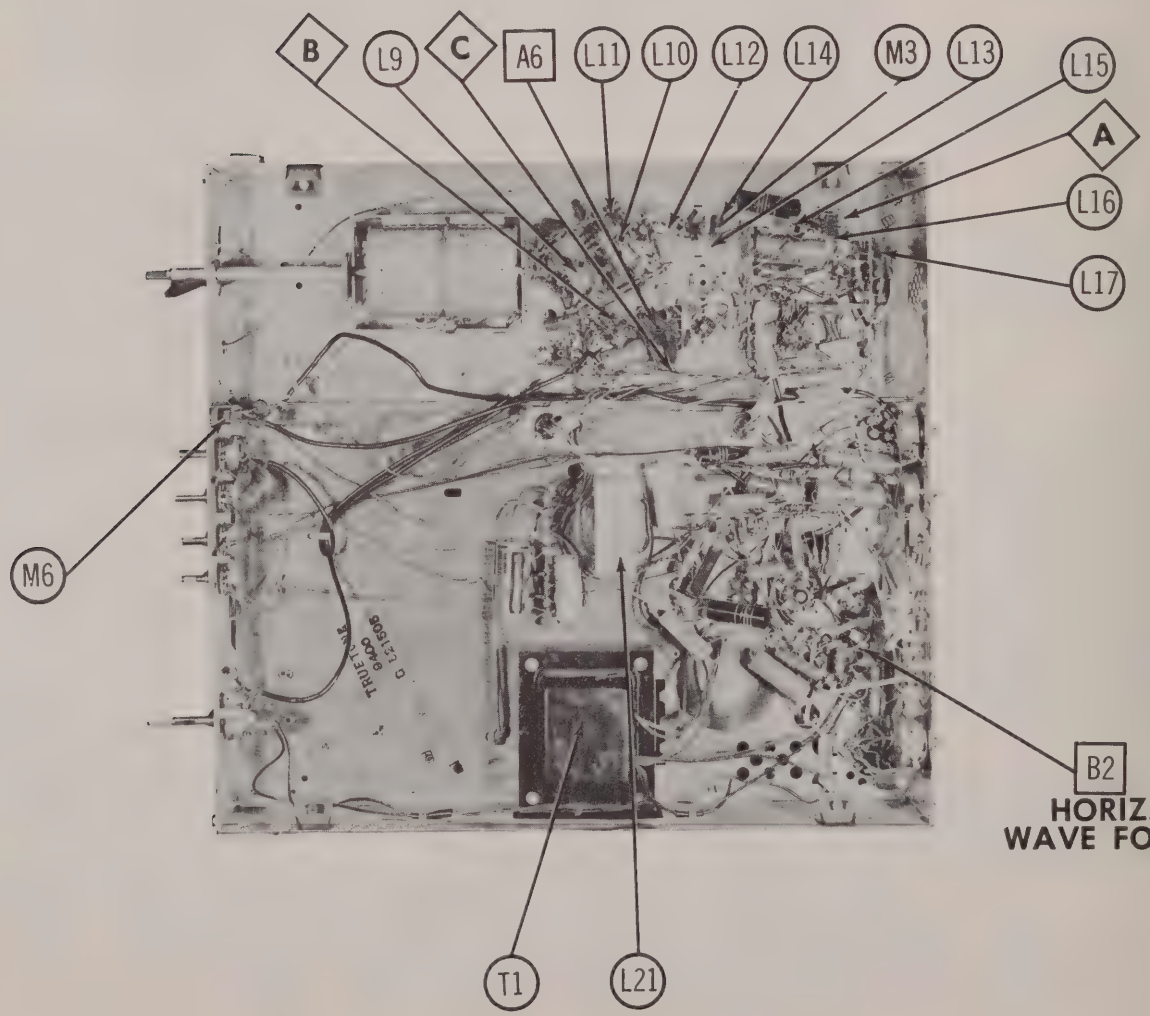
PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		TRUETONE PART No.	SYLVANIA PART No.		
M3	1N64	509386	1N132		Video detector

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Dial light	118921	# 47 bayonet
M5	Tuner	521287	
M6	Switch	520563	TV-phono DPST slide
M7	Centering magnet	521267	Includes rear yoke cover
M8	Ion trap	521183	
	Terminal strip	521095	Deflection yoke connections (mounts on M4)
	Connector	521184	Filament cap & lead for 1B3GT HV. rectifier
B3	Trimmer cap	520991	Dual 10-160MMF horiz. range & horiz. drive adjust.
	Cabinet	521404	
	Safety glass	520937	
	Knob	520836-A	Channel selector
	Knob	520837-A	Fine tuning
	Knob	520838-A	Off-on volume
	Knob	520839-A	Picture contrast
	Mask	521102-A	Kinescope



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check fuse, M1, AC interlock assembly, switch on volume control and T1. If filaments light, substitute V18. Check B+ filter and decoupling components.

SMALL AND/OR DIM PIX

Substitute V18. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M2. Check by substitution V14, V15, V16 and V17. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check R101, R102, C82, C88, R98, R99, T3, T5A and other associated components.	Check C77, C78, C79, C80, L20, R93, R113 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15, V16, V17 and V18. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V14, V15, V16, V17 and V18. Check R101, R102, C82, C88, R98, R99, T3, T5A, picture tube and other associated circuit components for failure or change of value.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss of Video".

RASTER NO SOUND NO PIX

Check by substitution V1, V2, V3, V4, V5 and V6. Check video detector assembly. Check components associated with the video IF strip.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing. Check video signal for interference pulses.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustment are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

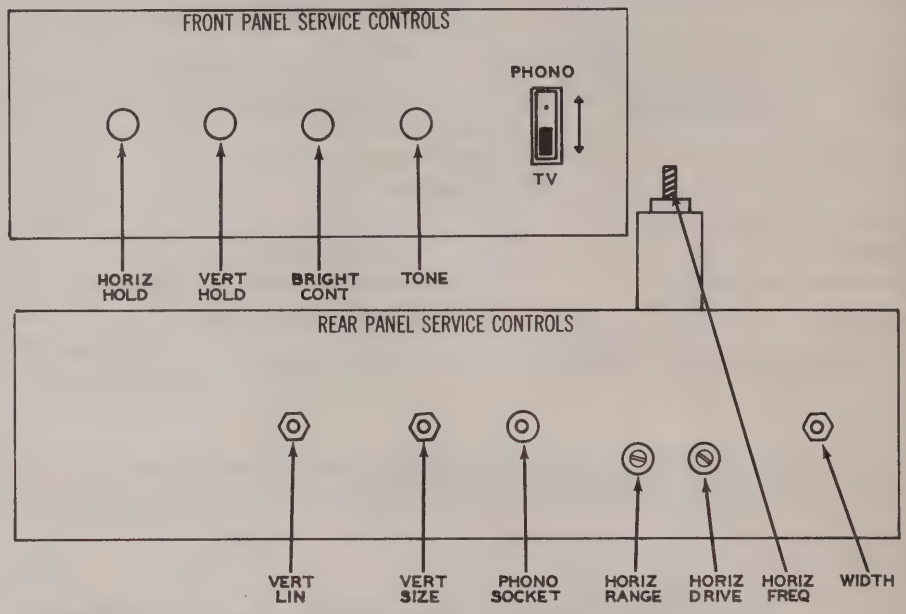
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove three wood screws holding wood strip at the top of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L2) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L19) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Disconnect built-in antenna.
3. Remove 7 wood and 1 metal screws. Remove rear cover.
4. Disconnect speaker plug.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.

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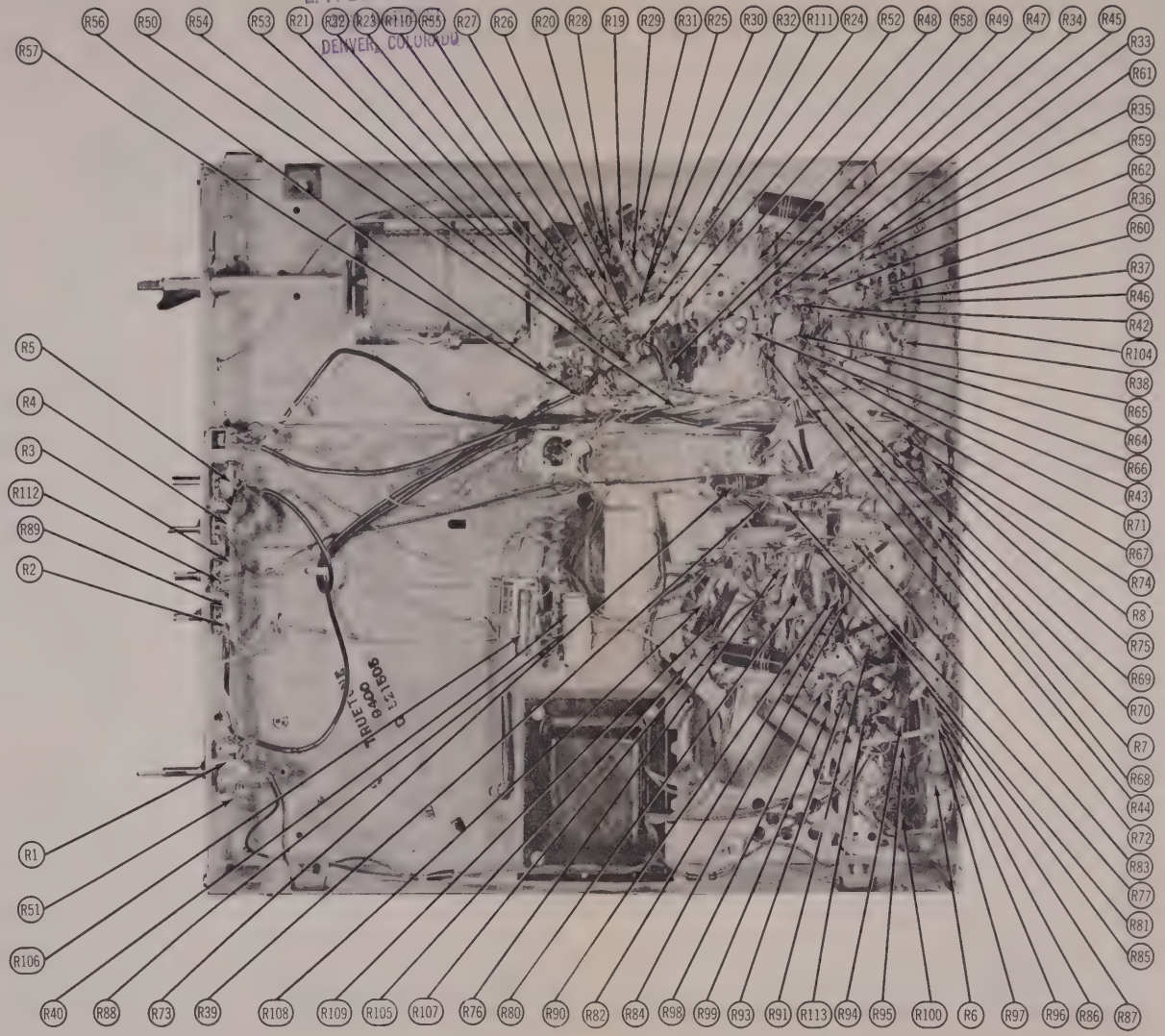
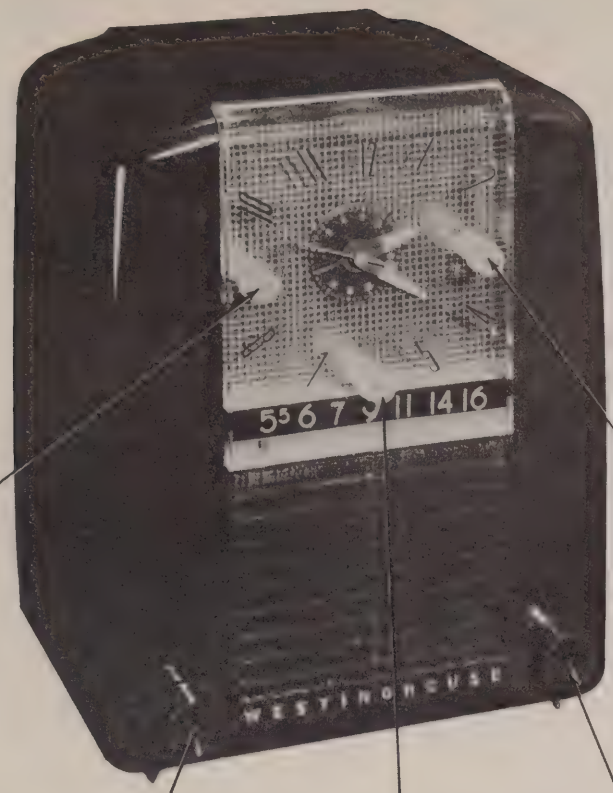


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

WESTINGHOUSE MODELS
H-397T5, H-398T5 (Ch. V-2184-2)



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WESTINGHOUSE MODELS
H-397T5, H-398T5 (Ch. V-2184-2)

TRADE NAME	Westinghouse Models H-397T5, H-398T5 (Ch. V-2184-2)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Sunbury, Pa.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycle — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200MMF	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	"	1625KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		WESTINGHOUSE PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	V-11611-1	PRS150/50-50		BBRD5515		2N521	TVA-2453	Orange Plain
B	50	150								
C2	10000		R2CC63Z5Z103P	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C3	2000		R2CCP1Z5Z202P	BPD-002	DD-202	TM5D2	812-002	DC-522	5HK-D2	
C4A	220									
B	5000									
C	5000		♦V-10789-2	♦PA-113-2	♦PC-151		♦1408-02		♦103C5	
D	250									
E										
C5	10000		R2CC63Z5Z103P	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C6	.047	400	V-10157-4473M	489ZX-01		PJ4S47		PT4147	4TM-S47	
C7	.05	400	RCP10M4503M	489ZX-05		PJ4S5		PT415	4TM-S5	
C8	10			S110	D6-100		GP1K-100	UC-541	5GA-Q1	

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B and R5C are combined in one unit.
When replacing items separately items C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	V-9993-9	Q13-133	AG-60-Z	BSK-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R2	22KΩ	½	RC20AE223M	BTS-22K	
R3	3.3Meg	½	RC20AE335M	BTS-3.3Meg	
R4	680Ω	½	RC20AE681M	BTS-680	
R5A	6.8Meg	½	♦V-10789-2	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	

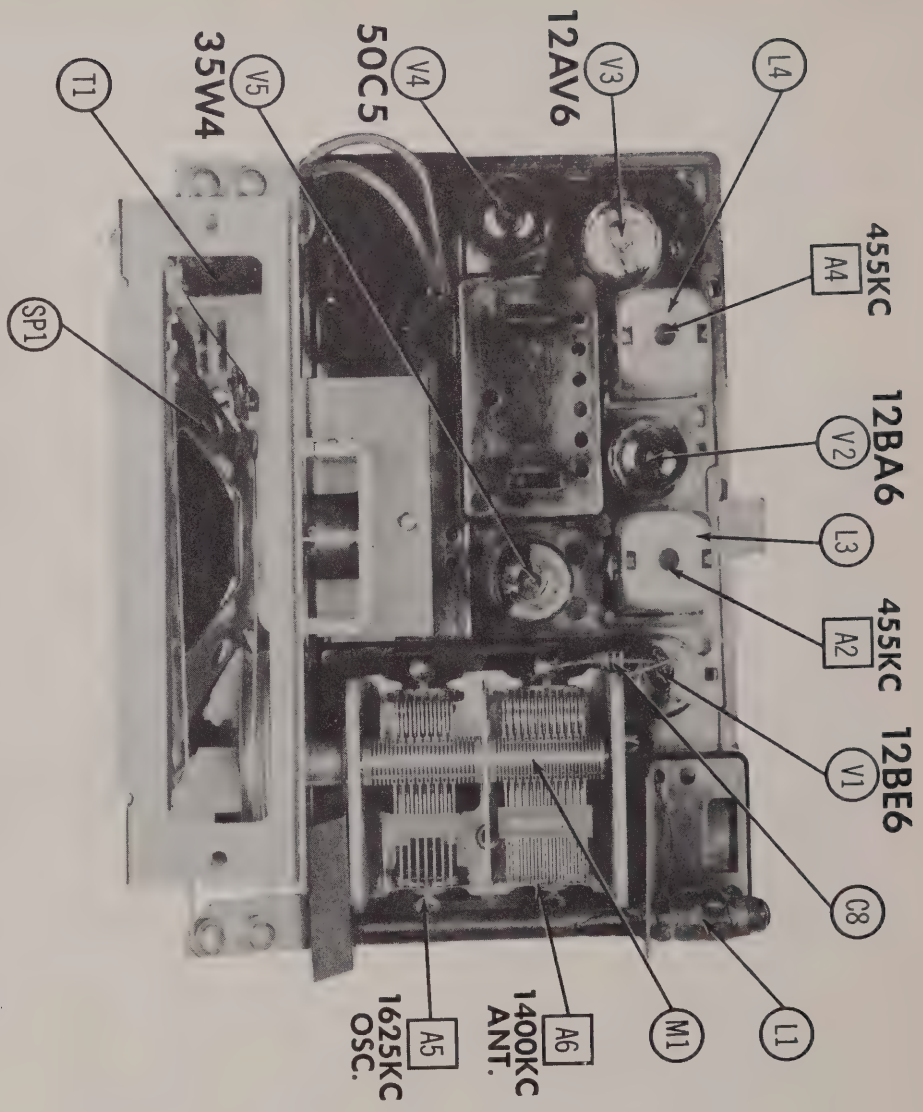
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R6	150Ω	½	RC20AE151M	BTS-150	
R7	1000Ω	1	RC30AE102M	BTA-1000	

♦ Items R5A, R5B, R5C, C4A, C4B, C4C, C4D, C4E, are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2KΩ	3.3Ω	204Ω	.82Ω	V-11561C-1	A-3332	A-3025	Z1101		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

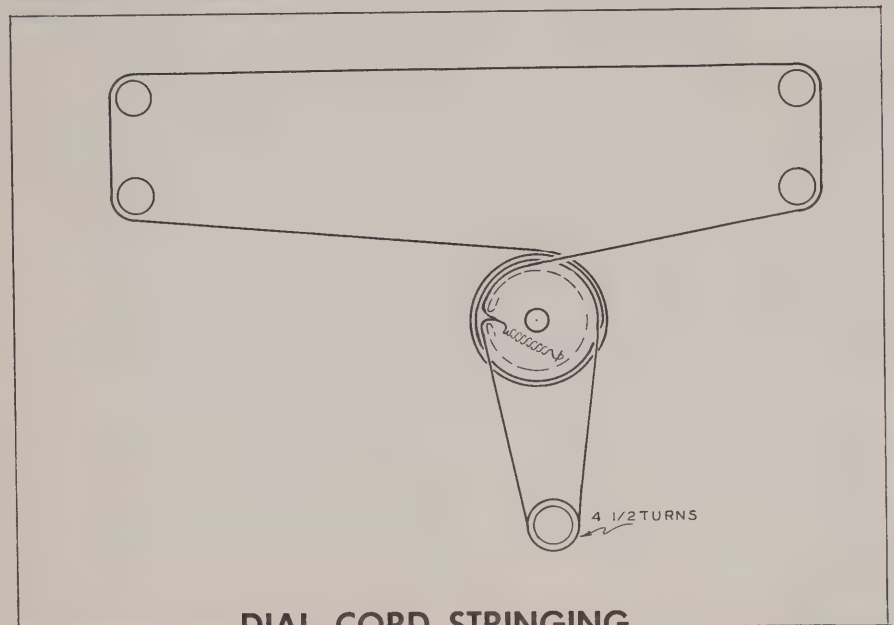
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	V-11554-1	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω		V-12017-1				
L2	Osc. Coil	.9Ω	12Ω	V-11555-1			69-Osc.	Westinghouse part no. includes R2 .
L3	Input IF	17Ω	17Ω	V-11579-1	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	V-11579-1	16-6758	BC-353	12-C2	

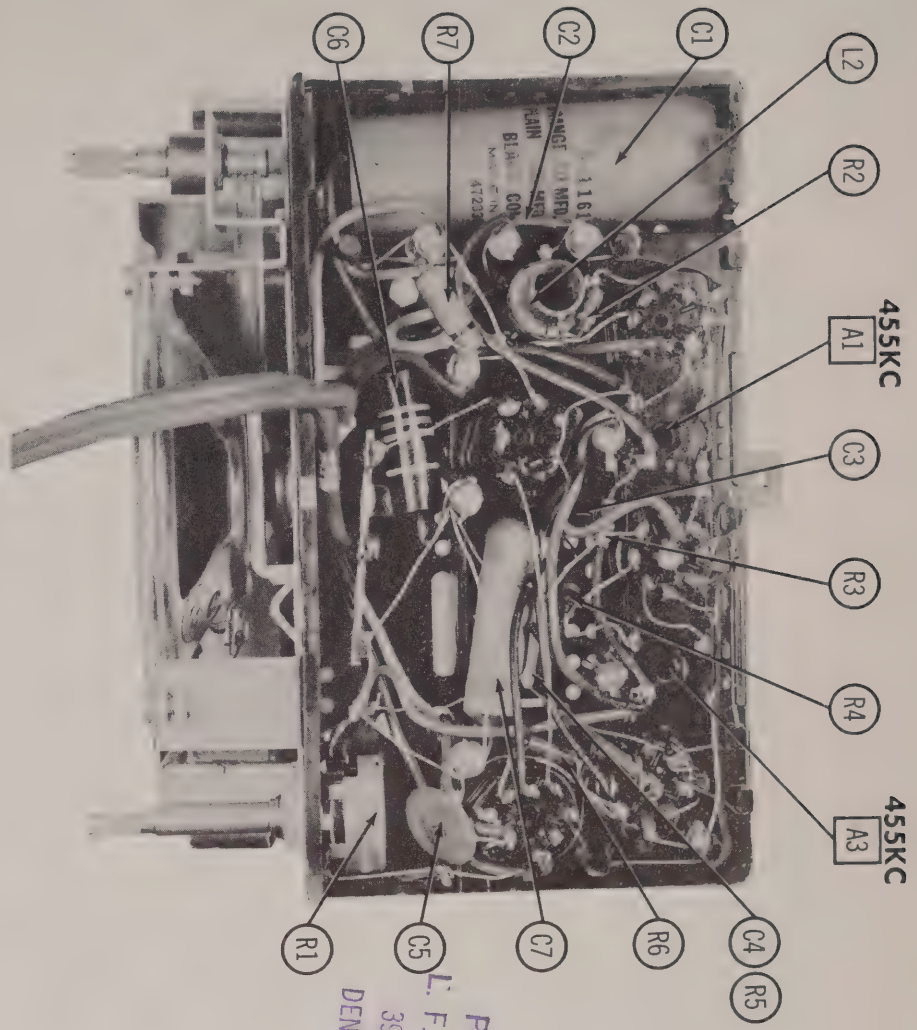
MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
MI	Tuning Cap.	V-11735-1	2 Section (31-420MMF) (16-110MMF)
	Cabinet	V-1318-2	Includes dial face, Model H397T5
	Cabinet	V-1318-3	Includes dial face, Model H398T5
	Knob	V-11573-1	(3) clock, H-397T5
	Knob	V-11573-5	(3) clock, H-398T5
	Knob	V-11746-2	Tuning & volume H-397T5
	Knob	V-11746-3	Tuning & Volume H-398T5
	Pointer	V-11749-1	
	Back Cover	V-11820-2	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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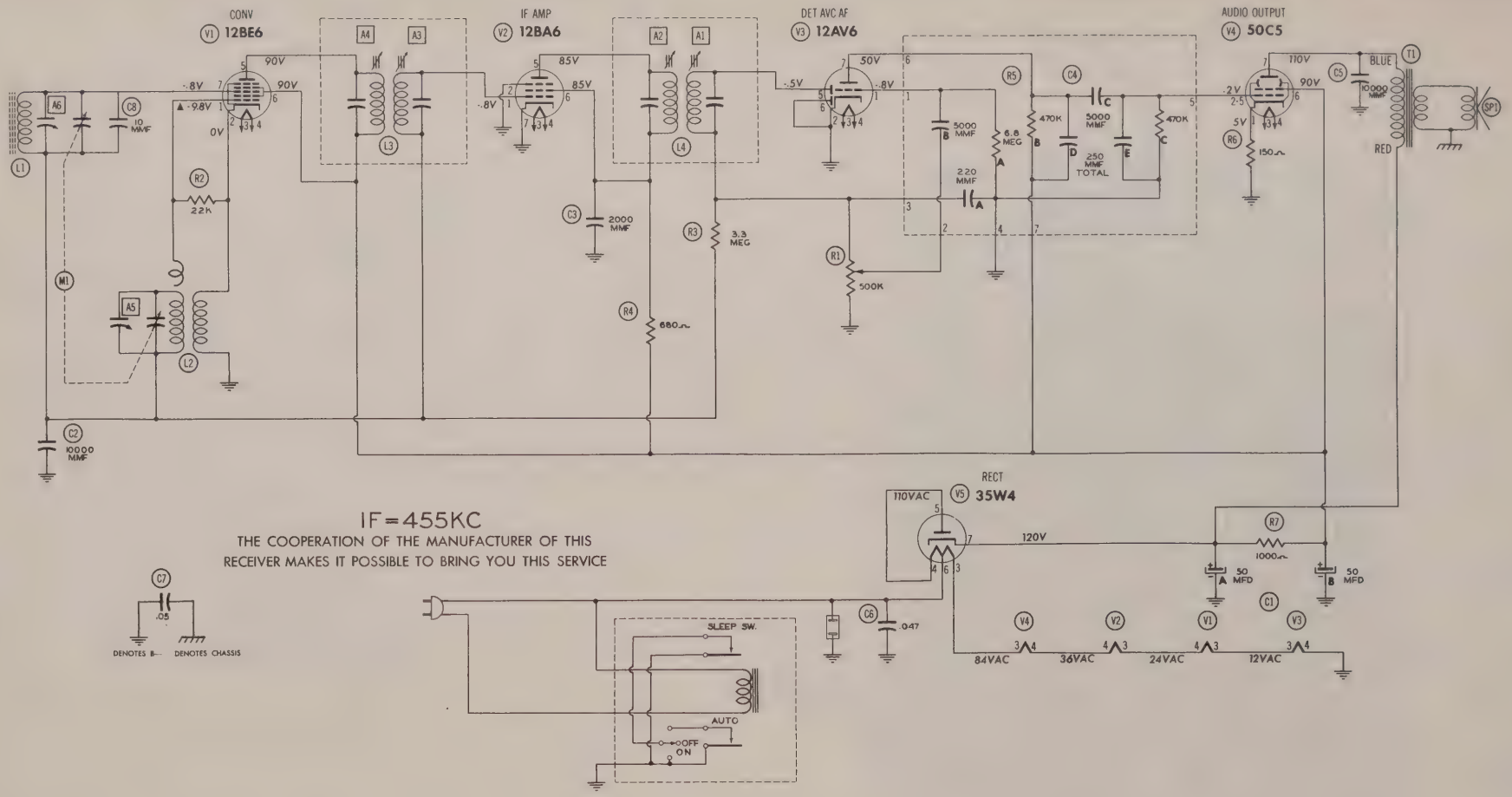
WESTINGHOUSE
MODEL H-397T5, (Ch. V-2184-2)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.9Ω	16Ω	32Ω	†1KΩ	†1KΩ	3.8Meg
V 2	12BA6	3.8Meg	0Ω	32Ω	45Ω	†1.7KΩ	†1.7KΩ	0Ω
V 3	12AV6	6.8Meg	0Ω	16Ω	0Ω	500KΩ	0Ω	†470KΩ
V 4	50C5	150Ω	470KΩ	120Ω	45Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	†1KΩ	INF	120Ω	160Ω	160Ω	150Ω	70KΩ

† MEASURED FROM PIN 7 OF V5

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232-10

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ZENITH MODEL L2281RU

TRADE NAME	Zenith	MODELS	TV CHASSIS	RADIO CHASSIS
		L1846E, L1846R, L1846EU, L1846RU	19L25	None
		L2236E, L2236R, L2236EU, L2236RU	19L27	None
		L2258E, L2258R, L2258EU, L2258RU	19L27	None
		L2262C, L2262R, L2262CU, L2262RU	19L27	None
		L2281, L2281E, L2281R, L2281U, L2281EU, L2281RU	19L27	4L03
		L2285R, L2285RU	19L27	8L20

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	TV-AM-FM-Phono Combination Receiver
TUBES	(TV) Twenty-two, (AM Radio) Four, (AM-FM Radio) Eight
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING (TV) 1.72 Amp. @ 117 Volts AC (AM Radio) .19 Amp. @ 117 Volts AC (AM-FM Radio .67 Amp. @117 Volts AC
TUNING RANGE	TV Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) (AM) 540-1620KC, (AM IF) 455KC, (FM) 88-108MC, (FM IF) 10.7MC

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FOR SERVICE INFORMATION ON RECORD CHANGER, SEE ZENITH MODEL S-14054, PHOTOFACT FOLDER SET 226, FOLDER 14.

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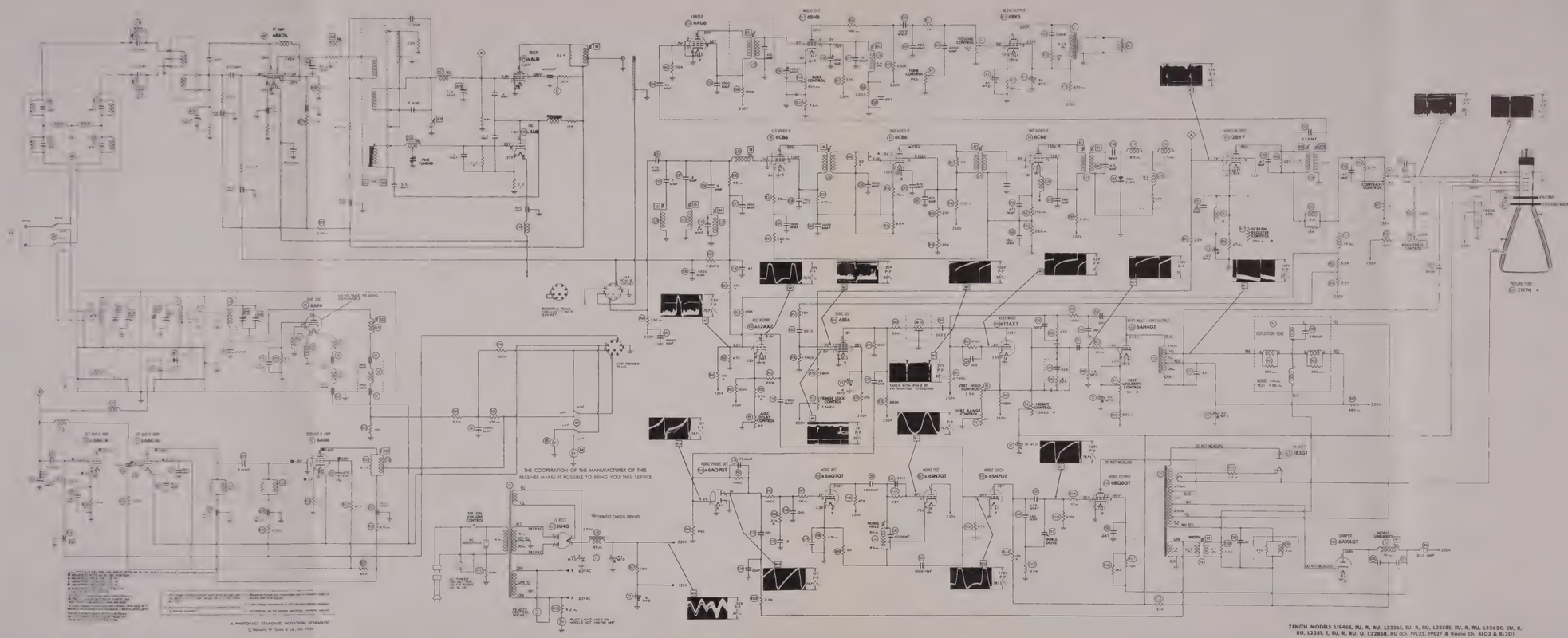
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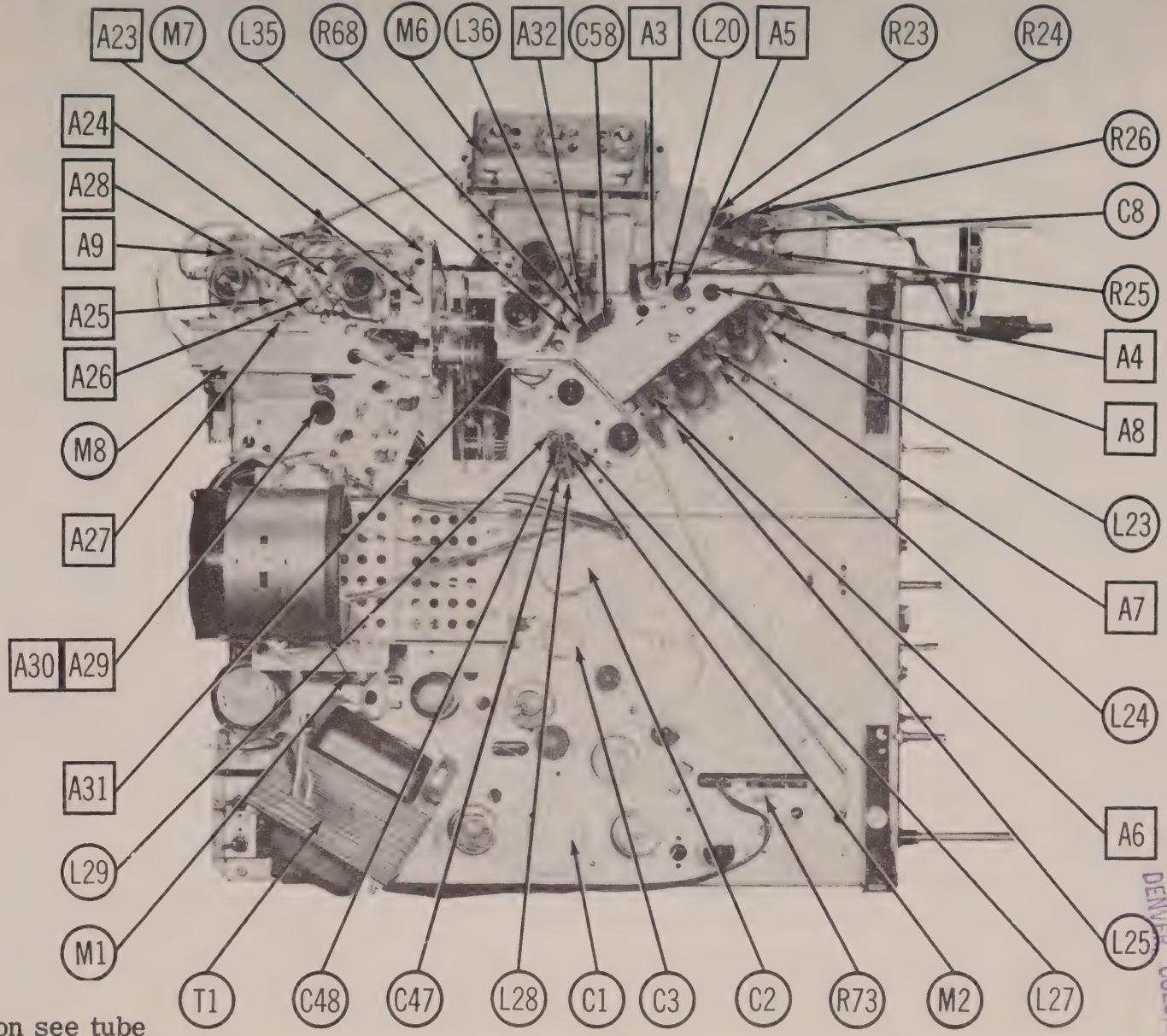

For tube location see tube placement chart page 5.

TV CHASSIS-TOP VIEW

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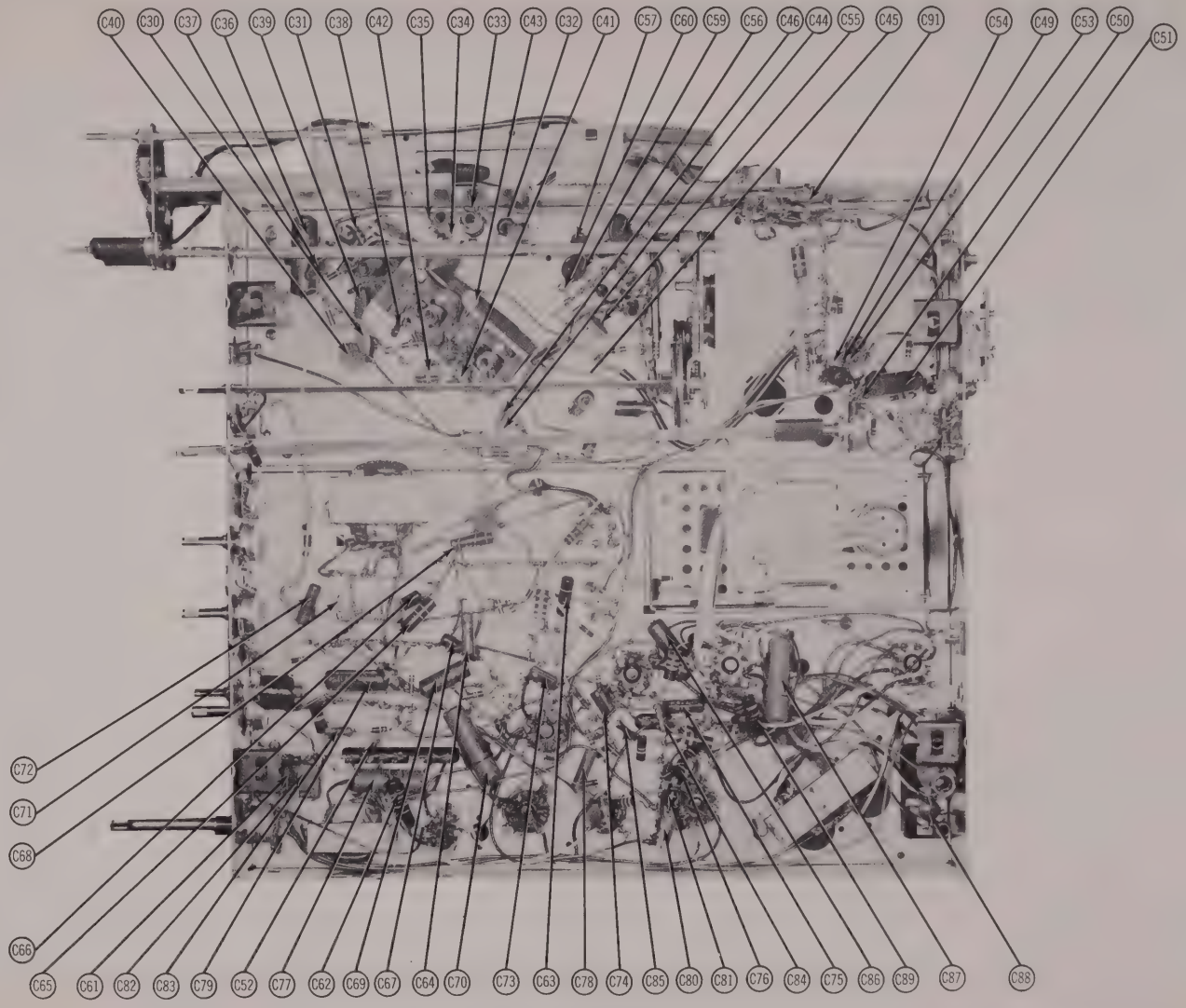

TV CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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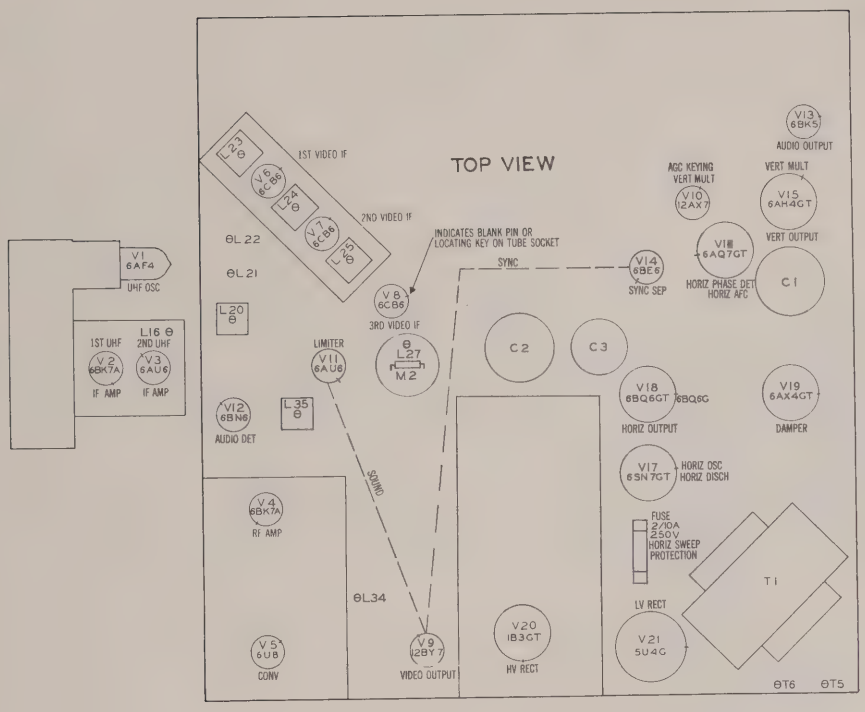


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V5, V6, V7, V8, V9 (V1, V2, V3 UHF only)
No pic, no sound, has snow - V4, V5, V6
No pic, has sound, has raster - V9, V22
Has pic, no sound - V11, V12, V13
Overloaded picture - V10

SYNC FAILURE
No vert. sync - V10, V14, V15
No horiz. sync - V14, V16, V17
No vert. or horiz. sync - V14

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V22 Fuse (M1)
No vertical deflection - V10, V15
Poor vert. linearity or foldover - V10, V15
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V21
Vert. off freq. - V10, V14, V15
Horiz. off freq. - V14, V16, V17

ZENITH MODELS L1846E, EU, R, RU, L2236E, EU, R, RU, L2258E, EU, R, RU, L2262C, CU, R, RU, L2281, E, EU, R, RU, U, L2285R, RU (Ch. 19L25, 19L27 & Radio Ch. 4L03 & 8L20)

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt bias supply to the ungrounded side of C37. Connect the positive lead to chassis. Use short leads.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V8). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2	Adjust for curve of maximum amplitude and symmetry similar to Fig.1. Attenuate generator for 3 volts peak to peak on scope.
2.	"	High side to point (B). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3 A4 A5	Remove the bias battery and set scope gain to amplify the trap region of the response curve as in Fig.2. Adjust for MINIMUM marker and amplitude.
3.	"	"	"	42.75MC 45.0MC 45.75Mc	"	"	A6, A7, A8, A9	Replace bias battery . Alternately adjust A6 thru A9 for response similar to Fig.3. A6 affects the low side and A7 the high side of the response curve. If proper response cannot be obtained SLIGHTLY retouch A1 and A2.

OSCILLATOR ALIGNMENT

The master oscillator adjustment of A10 is to be made only if the individual channel oscillator adjustment fails to bring the channels within the range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control but the higher channels do not, slight readjustment of A10 may be necessary to bring the higher channels in.
Connect the negative lead of the bias supply to the ungrounded side of C37. Connect positive lead to chassis. Adjust for -1 volt at C37.
Turn up the oscilloscope gain so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep g enerator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as in Fig. 4.
			63MC (10MC Swp)	65.75MC	3		A12	
			69MC (10MC Swp)	71.75MC	4		A13	
			79MC (10MC Swp)	81.75MC	5		A14	
			85MC (10MC Swp)	87.75MC	6		A15	
			177MC (10MC Swp)	179.75MC	7		A16	
			183MC (10MC Swp)	185.75MC	8		A17	
			189MC (10MC Swp)	191.75MC	9		A18	
			195MC (10MC Swp)	197.75MC	10		A19	
			201MC (10MC Swp)	203.75MC	11		A20	
			207MC (10MC Swp)	209.75MC	12		A21	
			213MC (10MC Swp)	215.75MC	13		A22	

RF AND MIXER ALIGNMENT

Connect a jumper from the turret AGC (yellow) lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.25MC 71.75MC	4	Vert. Amp. thru 10KΩ to point (C). (Accessible on top of tuner). Low side to chassis.	A23, A24 A25	Adjust for response similar to Fig.5.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	"	"	A26, A27 A28	Adjust A26 and A27 for symmetry of response similar to Fig.6. Adjust A28 for proper band width.

FIG.1

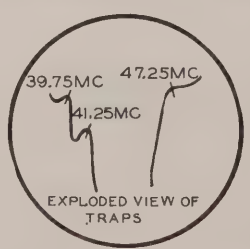


FIG2

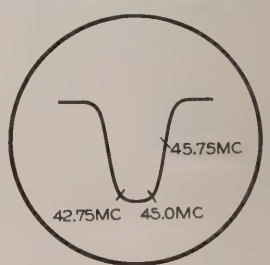


FIG.3

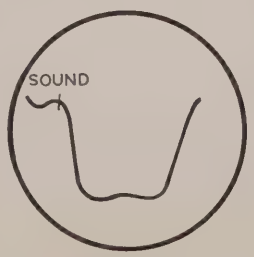


FIG.4

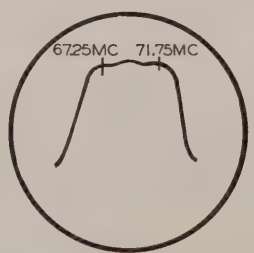


FIG.5

PROPERTY OF
L. F. [illegible]
[illegible] MADE ST.
DENVER, COLORADO

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna. Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 limiter-detector, as evidenced by a hiss similar to super-regeneration. Adjust the sound take-off transformer (A29 and A30) the sound IF transformer (A31) and the quadrature coil (A32) for maximum sound of best quality.
Adjust the buzz control (R10A) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control check the setting of the AGC delay adjustment.
If during the sound IF alignment the signal rises above the limiting level (hiss disappears) increase the attenuation until the hiss returns.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted in the field unless proper test equipment is available. If a UHF marker is not available it is possible to use another TV receiver equipped with an S-19670 tuner known to be calibrated. Couple the two tuners loosely (operate them close together) to inject a marker. This method furnished a marker source for all channels above 22. To obtain a marker for channel 22 set the signal source tuner to channel 14. Always subtract 8 channels for the oscillator frequency required. To obtain a channel 83 marker, set the source receiver to channel 75.
Switch receiver to "UHF" position.
Connect the negative lead of a 2 volt bias supply to the ungrounded side of C31. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	470MMF	High side to point ◇D◇. Low side to chassis.	44MC (10MC Swp)	42.75MC 45.0MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point ◇A◇. Low side to chassis.	A33	Adjust to obtain overall IF response curve similar to Fig. 3. Attenuate generator output to maintain 3 volts peak to peak on scope.
8.	Fig. 8	Across UHF antenna terminals thru matching network (Fig. 8)	713MC (20MC Swp)	711.25MC	54	"	A34	Tuner rocker arm should be in the horizontal position. If necessary, loosen set screws and adjust tuner shaft so that rocker arm is horizontal with indicator set to channel 54. Do not adjust A34 unless oscillator calibration if off more than three channels. If necessary, adjust A34 for response similar to Fig. 7 with video marker at 50%. The image (weaker response) will appear also. The response towards the counter clockwise position of A34 is the proper response.
9.	"	"	"	"	"	"	A35, A36, A37	Adjust for maximum amplitude and symmetry of response curve as in Fig. 7.
10.	"	"	473MC (20MC Swp)	471.25MC	14	"		Check for response similar to Fig. 7. If oscillator is off more than 3 channels adjust the oscillator travel (osc., mixer and ant. travel adjustments are the three round, thumb screws on top of tuner) adjustment to scale. Care must be used in making this adjustment so as not to move rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response.
11.	"	"	887MC (20MC Swp)	885.25MC	83	"	A38, A39 A40	Set A38 to scale as in Fig. 7. Adjust A39 and A40 for maximum response and symmetry.
12.	Check calibration on channels 14, 54 and 83. If necessary, repeat steps 8, 9, 10 and 11.							

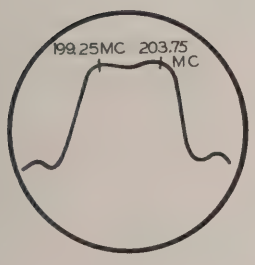


FIG.6

FIG.7

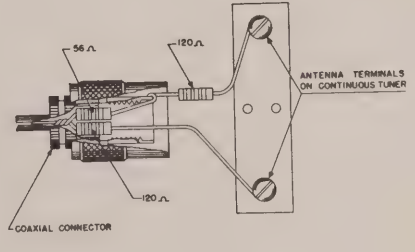


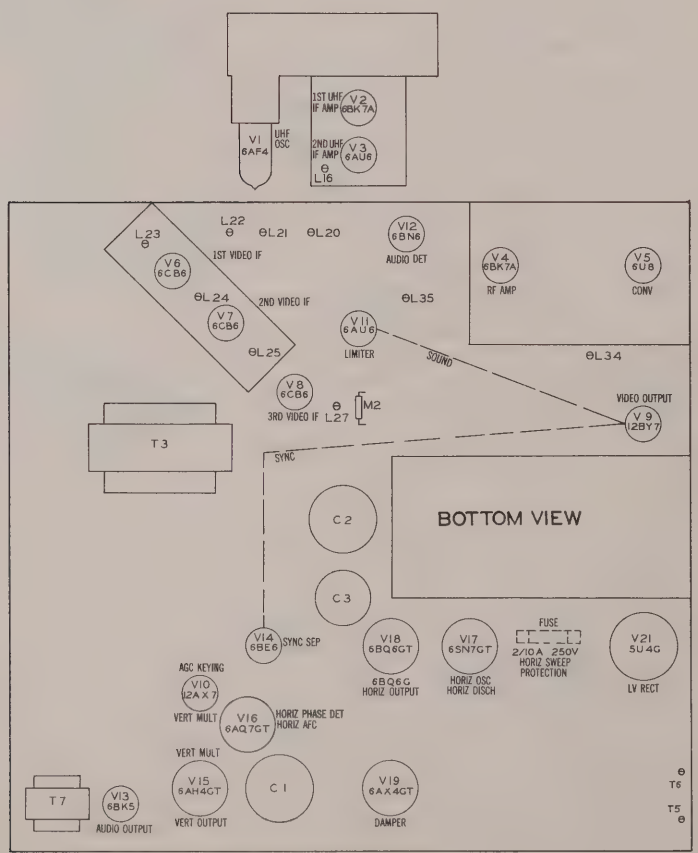
FIG.8

ZENITH MODELS L1846E, EU, R, RU, L2236E, EU, R, RU, L2258E, EU, R, RU, L2262C, CU, R, RU, L2281, E, EU, R, RU, U, L2285R, RU (Ch. 19L25, 19L27 & Radio Ch. 4L03 & 8L20)

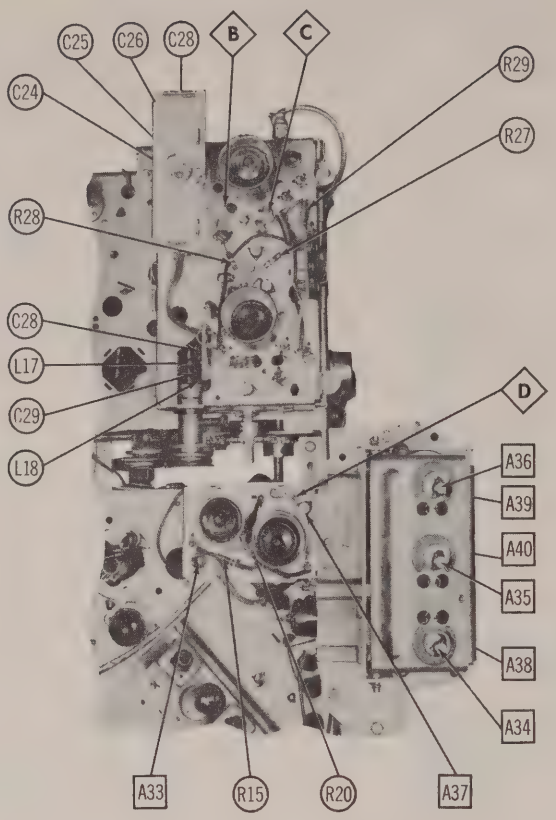
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	■† 5.5K	3.3KΩ	0Ω	.1Ω	.1Ω	3.3KΩ	■† 5.5KΩ		
V 2	6BK7A	■† 800Ω	■† 68KΩ	INF	.1Ω	0Ω	INF	3.7Meg	47Ω	0Ω
V 3	6AU6	3.5Meg	0Ω	.1Ω	0Ω	■† 400Ω	■†115KΩ	82Ω		
V 4	6BK7A	† 900Ω	55KΩ	INF	.1Ω	0Ω	INF	3.7Meg	47Ω	0Ω
V 5	6U8	† 10KΩ	68KΩ	† 100KΩ	.1Ω	0Ω	† 400Ω	0Ω	2.2KΩ	4.4KΩ
V 6	6CB6	1.2Meg	500Ω	.1Ω	0Ω	† 70KΩ	† 70KΩ	0Ω		
V 7	6CB6	† 65KΩ	† 70KΩ	.1Ω	0Ω	† 550K	† 550Ω	† 70KΩ		
V 8	6CB6	220Ω	370Ω	.1Ω	0Ω	† 8.3KΩ	† 8.3KΩ	0Ω		
V 9	12BY7	27Ω	2.7KΩ	27Ω	0Ω	0Ω	.1Ω	† 5KΩ	† 7KΩ	27Ω
V 10	12AX7	♦3.5Meg	500K	2.5KΩ	0Ω	0Ω	† 780KΩ	4.7KΩ	5.7K	.1Ω
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 100KΩ	† 100KΩ	0Ω		
V 12	6BN6	300Ω	.3Ω	.1Ω	0Ω	† 33KΩ	220KΩ	† 330KΩ		
V 13	6BK5	† 1KΩ	INF	65Ω	.1Ω	0Ω	180Ω	INF	† 550	INF
V 14	6BE6	25KΩ	0Ω	.1Ω	0Ω	† 100KΩ	†47KΩ	1.5Meg		
V 15	6AH4GT	1.8Meg	.1Ω	1.8Meg	INF	† 1.2KΩ	INF	0Ω	1KΩ	
V 16	6AQ7GT	2Meg	1Meg	0Ω	3Meg	† 47KΩ	470Ω	.1Ω	0Ω	
V 17	6SN7GT	47KΩ	♦200KΩ	0Ω	32KΩ	† 85Ω	10.5KΩ	.1Ω	0Ω	
V 18	6BQ6GT	INF	.1Ω	3.9KΩ	† 9KΩ	470KΩ	470KΩ	0Ω	0Ω	TOP CAP ♦ 11Ω
V 19	6AX4GT	♦ 10Ω	1.5Ω	10Meg	† 85Ω	† 100Ω	♦ 2.5Ω	.1Ω	0Ω	
V 20	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ♦ 481Ω
V 21	5U4G	INF	16KΩ	† 85Ω	20Ω	INF	19Ω	INF	16KΩ	
V 22	21YP4	0Ω	† 300KΩ	PIN 6 ♦33KΩ	PIN 10 ♦ 33KΩ	PIN 11 † 260KΩ	PIN 12 .1Ω			

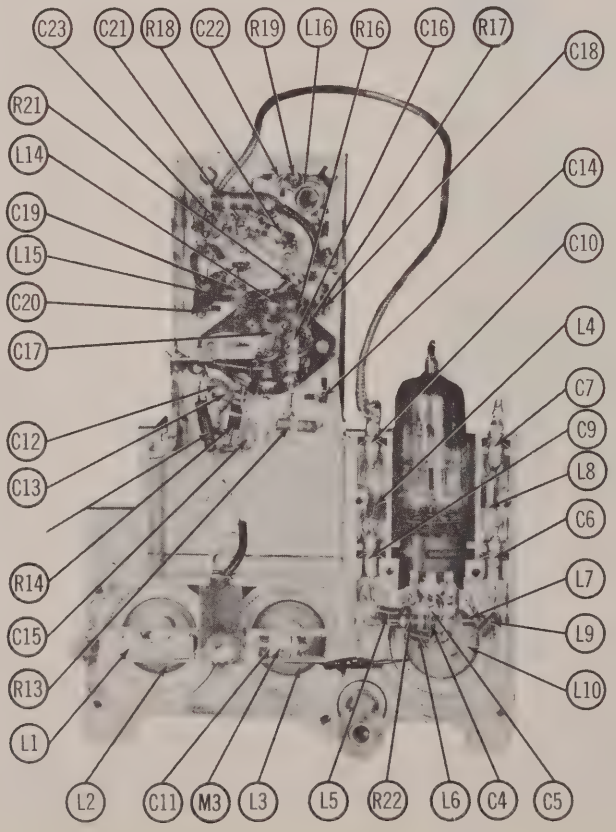
■ MEASURED WITH CHANGEOVER SWITCH IN UHF (OUT). ALL OTHERS IN VHF POSITION (IN).
† MEASURED FROM PIN 2 OFV21.
♦ MEASURED FROM PIN 3 OF V19.



TUBE PLACEMENT CHART



UHF-VHF TUNER- TOP VIEW



UHF TUNER-BOTTOM VIEW

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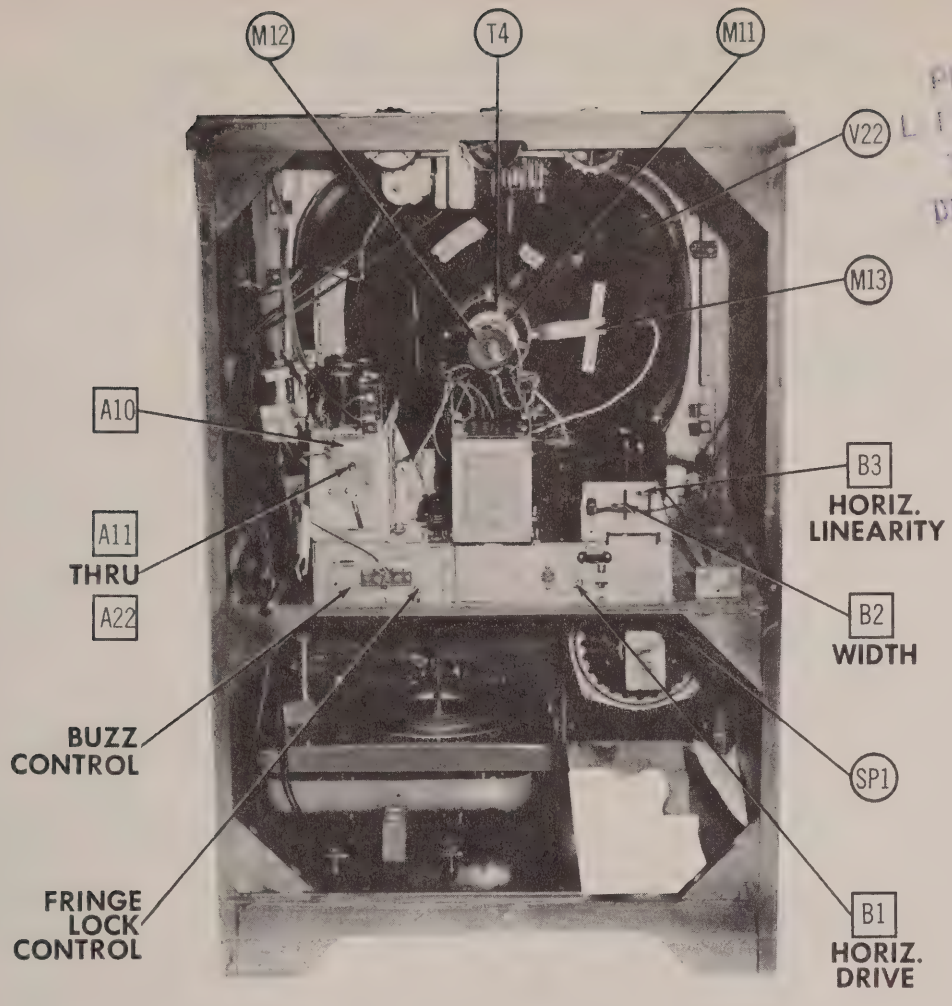


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold control until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1) for greatest picture width.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

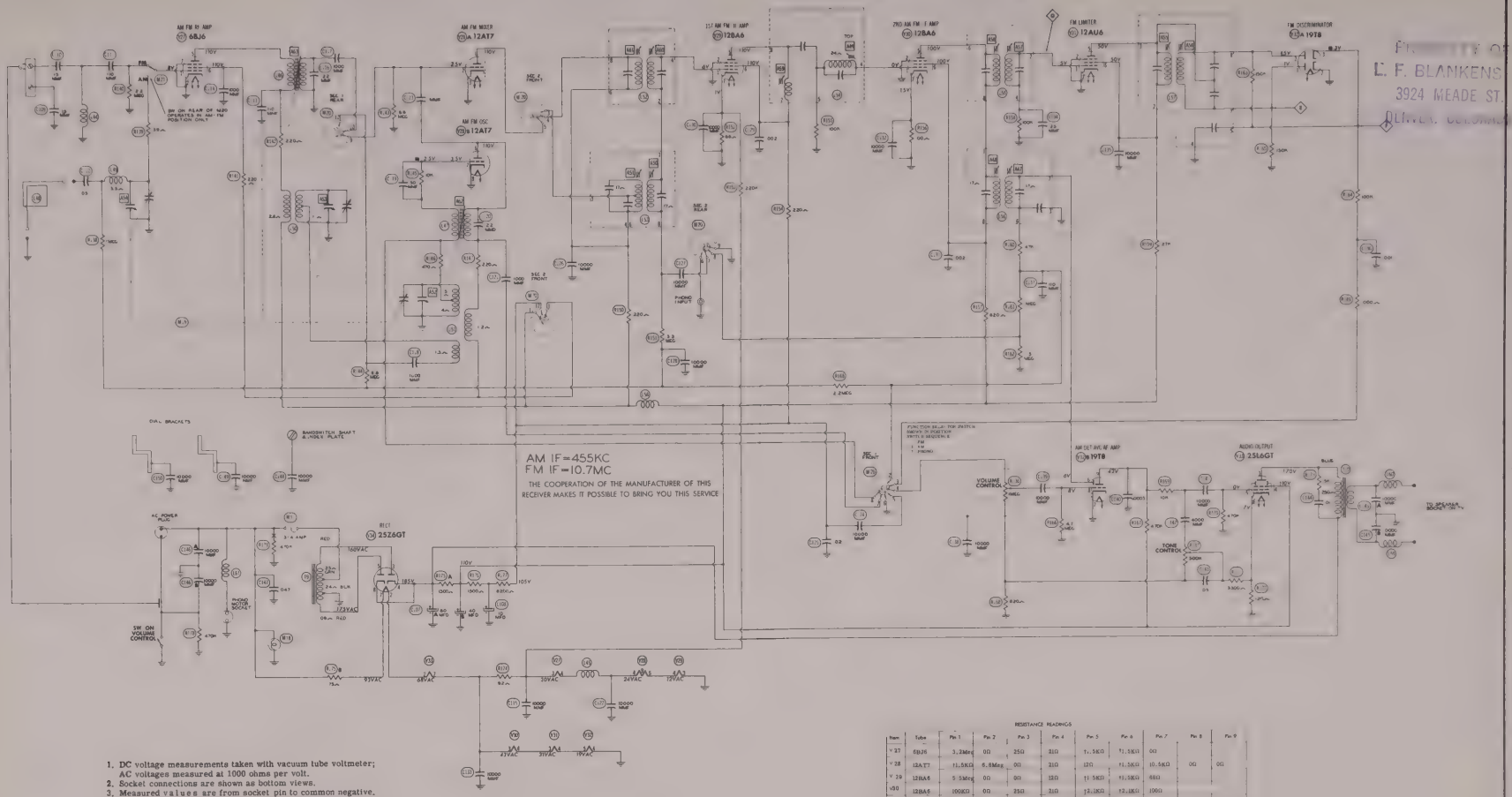
AGC DELAY CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope through a 10KΩ resistor to point Ⓐ. Low side to chassis.

Select the strongest TV signal available and adjust the delay control for 2.5 volts peak output.

An alternate method of adjusting the AGC delay control can be made by observing the picture. Starting from full clockwise position turn AGC delay control slowly counter clockwise until picture distorts and buzz is heard in the sound. Turn control clockwise for clearest picture and best sound.

PROPERTY OF
L. F. BLANKENS
3924 MEADE ST.
DENVER, COLORADO



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 27	6BJ6	3.2Meg	0Ω	25Ω	21Ω	1.5KΩ	71.5KΩ	0Ω		
V 28	12AT7	11.5KΩ	6.8Meg	0Ω	21Ω	12Ω	71.5KΩ	10.5KΩ	0Ω	0Ω
V 29	12BA6	5.53Meg	0Ω	0Ω	12Ω	11.5KΩ	71.5KΩ	68Ω		
V30	12BA6	100KΩ	0Ω	25Ω	21Ω	12.5KΩ	12.5KΩ	100Ω		
V31	12AU6	100KΩ	0Ω	21Ω	16Ω	128KΩ	128KΩ	0Ω		
V32	19T8	150KΩ	150KΩ	300KΩ	0Ω	35Ω	530KΩ	0Ω	4.7Meg	1470KΩ
V33	25L6GT	0Ω	32Ω	1250Ω	11.3KΩ	470KΩ	115KΩ	25Ω	120Ω	
V34	25Z6GT	0Ω	32Ω	50Ω	400KΩ	100Ω	INF.	37Ω	400KΩ	

* MEASURED WITH SELECTOR IN FM POSITION
† MEASURED FROM PIN 4 OF V34
ALL MEASUREMENTS TAKEN IN "AM" POSITION UNLESS NOTED.

232-11

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ZENITH MODELS L1846E, EU, R, RU, L2236E, EU, R, RU, L2258E, EU, R, RU, L2262C, CU, R, RU, L2281, E, EU, R, RU, U, L2285R, RU (Ch. 19L25, 19L27 & Radio Ch. 4L03 & 8L20)

AM FM RADIO SCHEMATIC

PROPERTY OF
J. C. PLAURENS
3 [illegible] PLACE ST
DENVER, COLORADO

RADIO ALIGNMENT INSTRUCTIONS

AM RADIO ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
13.	.5MFD	High side to pin 7 (grid) of 12BE6 (V23). Low side to B-	455KC (400~Mod)	Radio	Tuning gang fully open	Across voice coil	A41, A42 A43, A44	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
14.		Loop	1620KC	"	"	"	A45	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
15.		"	1400KC	"	Tune to 1400KC signal	"	A46	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 14 and 15.

AM-FM RADIO ALIGNMENT

Zenith alignment wrench (68-19) or equivalent should be used for IF alignment.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
16.	.05MFD	High side to pin 2 (grid) of 12AT7 (V28). Low side to chassis.	455KC (400~Mod)	BC	600KC	Across voice coil	A47, A48 A49, A50 A51	Adjust for maximum deflection.
17.		Loop	1600KC	"	1600KC	"	A52	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
18.		"	1400KC	"	1400KC	"	A53, A54	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use a 2Meg isolation resistor in series with the DC probe of the VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
19.	.05MFD	High side to pin 1 (grid) of 12AU6 (V31). Low side to chassis.	10.7MC (Unmod)	FM-100	Point on non-interference	DC probe to point (E). Common to chassis.	A55	Adjust for maximum deflection
20.	"	"	"	"	"	DC probe to point (E). Common to chassis.	A56	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
21.	"	High side to pin 1 (grid) of 12BA6 (V30). Low side to chassis.	"	"	"	DC probe to point (G). Common to chassis.	A57, A58	Adjust for maximum deflection.
22.	"	High side to pin (grid) of 12BA6 (V29). Low side to chassis.	"	"	"	"	A59	"
23.	"	High side to pin 2 (grid) of 12AT7 (V28), Low side to chassis.	"	"	"	"	A60, A61	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
19.	.05MFD	High side to pin 1 (grid) of 12AU6 (V31). Low side to chassis.	10.7MC (450KC Swp)	FM-100	Point of non-inteference	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A55	Adjust for curve of maximum amplitude and symmetry similar to Fig. 9.
20.	"	"	"	"	"	Vert. Amp. to point (F). Low side to chassis.	A56	Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 10. SLIGHTLY retouch A55 for maximum amplitude and straightness of crossover lines.
21.	"	High side to pin 2 (grid) of 12AT7 (V28). Low side to chassis.	"	"	"	Vert. Amp. to point (G). Low side to chassis.	A57, A58 A59, A60 A61	Adjust for curve of maximum amplitude and symmetry similar to Fig. 9. Continue alignment with step 24.

FM AND MIXER ALIGNMENT

Remove FM line antenna.
Slugs may be loosened by applying hot iron to cement.
Use a 2Meg isolation resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
24.	270Ω Carbon resistor	Across FM antenna terminals.	98MC (Unmod)	FM-100	98MC	DC probe to point (G). Common to chassis.	A62, A63	Adjust for maximum deflection.

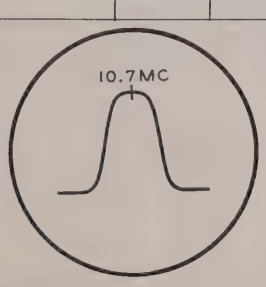


FIG. 9

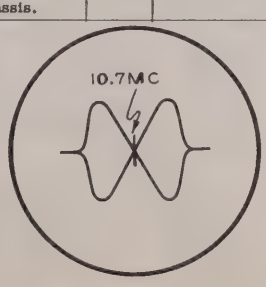


FIG. 10

AM-RADIO PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V23	Converter	12BE6	12BE6	7CH	
V24	Sound IF Amp.	12BA6	12BA6	7BK	
V25	Det-AF Amp.	12AT6	12AT6	7BT	
V26	Audio Output	50C5	50C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C93A	■80	150	22-2272	AFH3-13		CO12			R1040	
B	▲40	150								
C	20	150								
C94	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C95	110		22-5							
C96	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C97	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C98	.01	200	22-826	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C99	4000		22-4	BPD-004	D6-402	TM5D4	GP2-333-402	DC-524	5HK-D4	
C100	4000		22-4	BPD-004	D6-402	TM5D4	GP2-333-402	DC-524	5HK-D4	
C101	470		22-6	BPD-00047	D6-471		GP2K-471	UC-5347	5GA-T47	
C102	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C103	.0047	400	22-1783	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C104	.05	200	22-1158	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C105	.05	200	22-829	489ZX-05		PJ4S5		PT415	4TM-S5	
C106	.05	200	22-829	489ZX-05		PJ4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R116A	500KΩ	½	63-2909	Q13-133	AG-60-Z	BSK-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R116A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R116A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R117	22KΩ	½	63-1842	BTS-22K	
R118	3.3Meg	½	63-1933	BTS-3.3Meg	
R119	120Ω	½	63-1747	BTS-120	
R120	2.2Meg	½	63-1926	BTS-2.2Meg	
R121	2.2Meg	½	63-1926	BTS-2.2Meg	
R122	220KΩ	½	63-1884	BTS-220K	
R123	6.8Meg	½		BTS-6.8Meg	Note
R124	1Meg	½	63-1912	BTS-1Meg	
R125	1000Ω	½	63-1786	BTS-1000	
R126	10KΩ	½	63-1828	BTS-10K	
R127	470KΩ	½	63-1898	BTS-470K	
R128	470KΩ	½	63-1898	BTS-470K	
R129	150Ω	1	63-1977	BTA-150	
R130	1500Ω	½	63-1793	BTS-1500	
R131	5600Ω	½	63-1817	BTS-5600	
R132	10KΩ	½	63-1828	BTS-10K	
R133	22Ω	1	63-2359		
R134	1500Ω	2	63-2321	BTB-1500	
R135	220Ω	6	63-3190	1 3/4A-225	

Note. Some models may use a 15 Meg resistor in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	NOTES
T8	3.6KΩ	3.3Ω	256Ω	.73Ω SEC.2 15Ω	95-1367	A-3849	A-3018	Z1002	S-4X ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L40	Loop Ant.	1.2Ω		S-20633				
L41	Osc.Coil	.8Ω	5.5Ω	S-20612	14-1074		70-Osc.	Includes core, core part #94-812
L42	Input IF	22Ω	23Ω	95-1101	16-6666	BC-368	012-C1	
L43	Output IF	17Ω	17Ω	95-1102	16-6770 *	BC-355 *	12-C6 *	

* Use adaptor plate and cut out center spade bolt mounting support.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA: ZENITH PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M14	.063A	212-13	5M4	1101A	6S100	100	

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M15	Tuner	22-2512	2 gang (32-437MMF, 25-175MMF)
M16	Switch	85-539	Function -radio, phono
	Knob	46-1168	Volume, off-on
	Knob	46-1227	Tuning
	Knob	46-1128	Function
	Record Changer	S-14054	

AM-FM RADIO PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V27	AM FM RF Amp.	6BJ6	6BJ6	7CM	
V28	AM FM Converter	12AT7	12AT7	9A	
V29	1st Sound IF Amp.	12BA6	12BA6	7BK	
V30	2nd Sound IF Amp.	12BA6	12BA6	7BK	
V31	Limiter	12AU6	12AU6	7BK	
V32	Discriminator - AM Detector AVC - AF Amplifier	19T8	19T8	9E	
V33	Audio Output	25L6GT	25L6GT	7S	
V34	Rectifier	25Z6GT	25Z6GT	7Q	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C107A	▲80	250	22-2105	AFH2-64		BO48		FP413X	TVL-2582	
B	▲40	250								
C108	10	250	22-2154	PRS250/12		BR1025		TC52	TVA-1504	
C109	15		22-2140	SII5	D6-150		GP1K-150	UC-5415	5GA-Q15	
C110	15		22-2140	SII5	D6-150		GP1K-150	UC-5415	5GA-Q15	
C111	110		22-5							
C112	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C113	110		22-5							
C114	1000		22-1676	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C115	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C116	22		22-1506							
C117	1000		22-1676	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C118	1000		22-1676	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C119	50		22-1367							
C120	22		22-1506							
C121	1000		22-1676	SII000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C122	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C123	1		22-1762							
C124	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C125	.02	400	22-1379	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C126	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C127	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C128	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C129	.002	600	22-1220	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C130	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C131	.002	600	22-1220	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C132	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C133	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C134	25		22-1507	SI25	D6-250		GP1K-250	UC-5425	5GA-Q25	
C135	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C136	.001	200	22-1717	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C137	110		22-5							
C138	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C139	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C140	.0005	600	22-854							
C141	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C142	4000		22-4	BPD-004	D6-402	TM5D4	GP2-333-402	DC-524	5HK-D4	
C143	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C144	.01	600	22-669	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C145A	10000		22-2276	BPD-2X01	DD3-103	TM5DS1	811-01	DCD-511	5HK-2S1	
B	10000						811-01			
C146A	10000		22-2276	BPD-2X01	DD3-103	TM5DS1	811-01	DCD-511	5HK-2S1	
B	10000						811-01			
C147	.047	400	22-1775	489ZX-05		PJ4S47		PT4147	4TM-S47	
C148	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C149	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C150	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R136A	1Meg	½	63-2131	Q11-137		AB-69		Volume
B	Shaft		Not Req.	Not Req.		AK-1/4		Attach to R136B
C	Switch		Not Req.	76-1		KB-1		Attach to R136B
R137A	500KΩ	½	63-2132				U-50	Tone
B	Shaft		Not Req.				DS-37	Attach to R137A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R138	1Meg	½	63-1912	BTS-1Meg	
R139	39Ω	½	63-1726	BTS-39	
R140	2.2Meg	½	63-1926	BTS-2.2Meg	
R141	220Ω	½	63-1758	BTS-220	
R142	220Ω	½	63-1758	BTS-220	
R143	6.8Meg	½	63-1947	BTS-6.8Meg	
R144	6.8Meg	½	63-1947	BTS-6.8Meg	
R145	10KΩ	½	63-1827	BTS-10K	
R146	470Ω	½	63-1772	BTS-470	
R147	220Ω	½	63-1758	BTS-220	
R148	2.2Meg	½	63-1926	BTS-2.2Meg	
R149	1000Ω	½	63-1786	BTS-1000	
R150	220Ω	½	63-1758	BTS-220	
R151	3.3Meg	½	63-1933	BTS-3.3Meg	
R152	68Ω	½	63-1736	BTS-68	
R153	220KΩ	½		BTS-220K	
R154	220Ω	½	63-1758	BTS-220	
R155	100KΩ	½	63-1870	BTS-100K	
R156	100Ω	½	54-1744	BTS-100	
R157	820Ω	½	63-2091	BTS-820	
R158	100KΩ	½	63-1870	BTS-100K	
R159	27KΩ	½	63-1845	BTS-27K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R160	47KΩ	½	63-1856	BTS-47K	
R161	1Meg	½	63-1912	BTS-1Meg	
R162	15Meg	½	63-1961	BTS-15Meg	
R163	150KΩ	½	63-1876	BTS-150K	
R164	100KΩ	½	63-1870	BTS-100K	
R165	150KΩ	½	63-1876	BTS-150K	
R166	4.7Meg	½	63-1940	BTS-4.7Meg	
R167	470KΩ	½	63-1898	BTS-470K	
R168	820Ω	½	63-1782	BTS-820	
R169	10KΩ	½	63-1828	BTS-10K	
R170	470KΩ	½	63-1898	BTS-470K	
R171	3300Ω	½	63-1806	BTS-3300	
R172	120Ω	1	63-1981	BTA-120	
R173	15KΩ	½	63-1834	BTS-15K	
R174	82Ω	2	63-2428		
R175A	1300Ω	20	63-2068		
B	75Ω	5			
R176	1500Ω	½	63-1793	BTS-1500	
R177	8200Ω	1	63-1576	BTA-8200	
R178	470KΩ	½	63-1898	BTS-470K	
R179	470KΩ	½	63-1898	BTS-470K	Note

Note. Not Used in all Models

AM-FM RADIO PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.
T9	117VAC @ .67A tap @ 350VCT .114ADC				95-1188 ①				

① Auto Transformer

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T10	2.8KΩ	3.3Ω	250Ω	.83Ω	95-1272	A-3849	A-3018	Z1002	S-1X ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L44	FM Ant. Coil	0Ω		S-16408				
L45	Fil. Choke	1Ω		S-13997			4612	9.5 Microhenries
L46	FM RF Coil	0Ω	0Ω	S-15743				
L47	FM Osc. Coil	0Ω	0Ω	S-15691				
L48	AM Loop Ant.	0Ω		S-16841				
L49	AM Ant. Loading Coil	3.5Ω		S-18812	19-3250	TV-185	4646	223 Microhenries
L50	AM RF Coil	2.8Ω	11Ω	S-16344				Secondary tapped @ 3.4Ω
L51	AM Osc. Coil	1.2Ω	9Ω	S-16345				Secondary tapped @ 3.7Ω, pick up winding -1.3Ω
L52	1st. FM IF	.5Ω	.5Ω	95-1201	16-6665 *	FM-251	1451	
L53	1st. AM IF	17Ω	17Ω	95-1248				Primary tapped @ 4.6Ω
L54	2nd. FM & AM IF	24Ω		95-1251				Includes RF Choke & coupling Capacitor
L55	3rd. FM IF	.5Ω	.5Ω	95-1150	16-3487 †	FM-251 ▲	1451 ▲	
L56	3rd. AM IF	17Ω	17Ω	95-1102	16-6770 ■	BC-355 ■	12-C6 ■	
L57	FM Discriminator	.3Ω	.4Ω	95-1153	17-3484 ▲	FM-250 ‡	1452 ‡	
L58	RF Choke	1Ω		20-337			4608	3.8 Microhenries
L59	Audio Choke	.1Ω		20-337			4608	3.8 Microhenries
L60	Audio Choke	.1Ω		20-337			4608	3.8 Microhenries
L61	Line Choke	.1Ω		20-337			4608	3.8 Microhenries

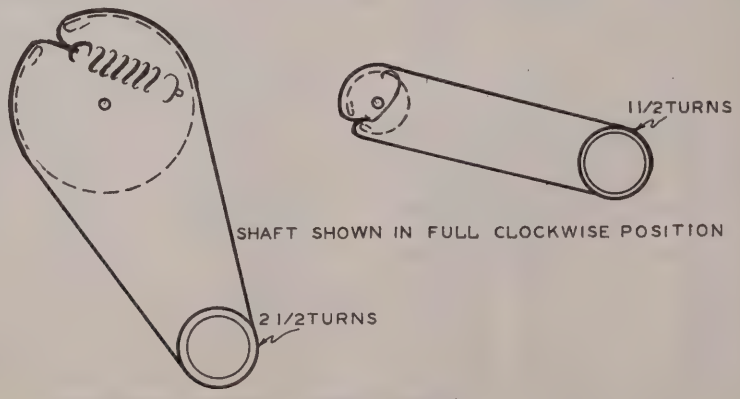
* Drill new mounting holes.
† Remove center spade bolt mounting support and use adaptor plate
▲ Remove cnter spade bolt mounting support.
■ Use adaptor plate and remove center spade bolt mounting support.
▲ Add diode filter capacitor externally, drill new mounting holes and remove center spade bolt mounting support.
‡ Add diode filter cap. externally and remove center spade bolt mounting support

FUSES

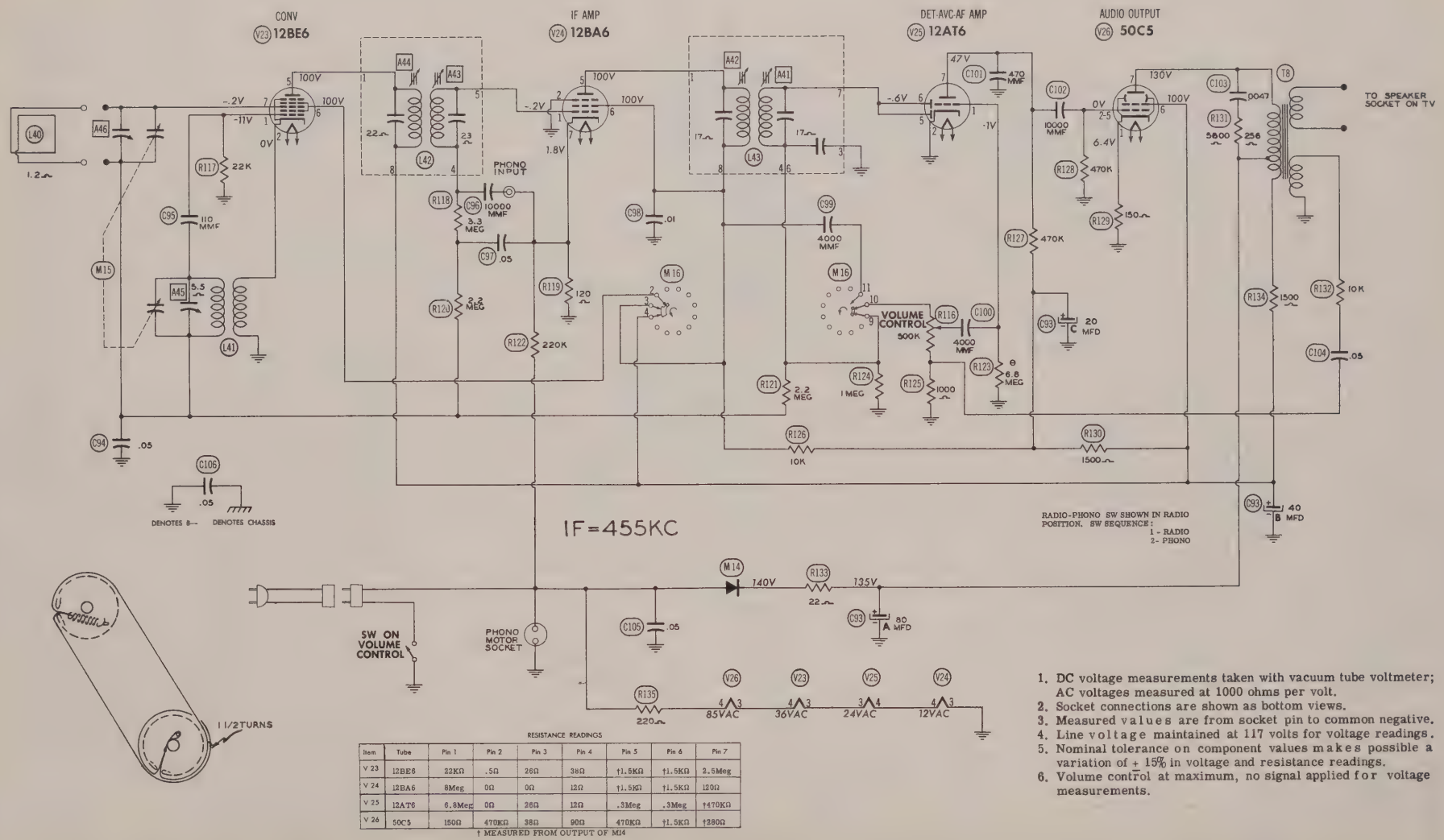
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M17	3AG P/T	3/4A	136-25		218.750 (3AG P/T-3/4A)		GJV 3/4	

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M18	Dial light	100-87	117V-10 watt bulb
M19	Tuning capacitor	22-2400	3 section (18-370MMF, 11-200MMF, 11-85MMF)
M20	Switch	85-534	Function-AM, FM phono
M21	Switch	85-505	SPDT antenna select-actuated by M20
	Knob	S-19316	Off-on volume assembly
	Knob	46-1041	Tuning
	Knob	46-1043	Function selector
	Knob	46-1053	Tone
	Dial glass	192-138	
	Record Changer	S-14054	



DRIVE CORD STRINGING



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 23	12BE6	22KΩ	.5Ω	26Ω	38Ω	†1.5KΩ	†1.5KΩ	2.5Meg
V 24	12BA6	8Meg	0Ω	0Ω	12Ω	†1.5KΩ	†1.5KΩ	120Ω
V 25	12AT6	6.8Meg	0Ω	26Ω	12Ω	.3Meg	.3Meg	†470KΩ
V 26	50C5	150Ω	470KΩ	38Ω	90Ω	470KΩ	†1.5KΩ	†280Ω

† MEASURED FROM OUTPUT OF M14

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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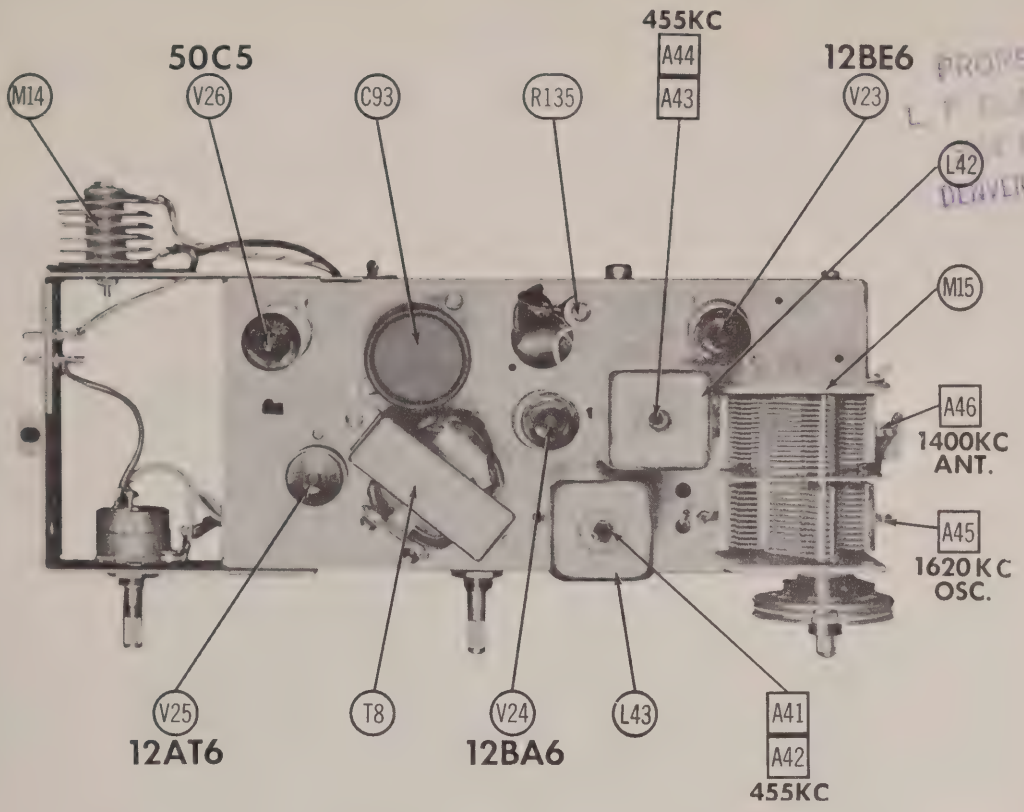
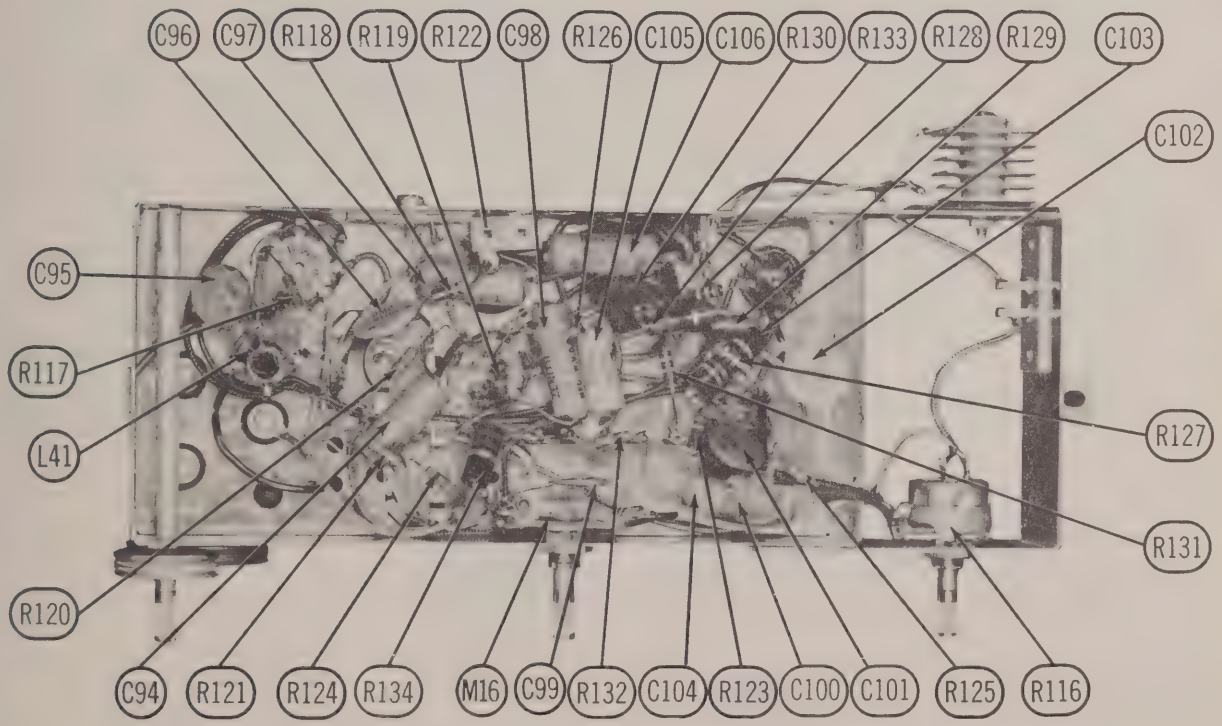
ZENITH MODELS L1846E, EU, R, RU, L2236E, EU, R, RU, L2258E, EU, R, RU, L2262C, CU, R, RU, L2281, E, EU, R, RU, U, L2285R, RU (Ch. 19L25, 19L27 & Radio Ch. 4L03 & 8L20)

AM RADIO SCHEMATIC

PROPERTY OF
L. F. DARWENT
DENVER, COLORADO



AM-RADIO CHASSIS TOP VIEW



AM-RADIO CHASSIS BOTTOM VIEW

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18, V19 and V21. Check adjustments B1, B2 and B3. Check waveform W17.

If Satisfactory	If Unsatisfactory
Check C86, C87, C88, C89, R106, R107, R109, T2, T4A and other associated circuit components.	Check C83, C84, C85, R102, R104, R114, and other associated circuit components.

DRIVE LINES

Check adjustment B1. Check by substitution V17, V18 and V19. Check C83, C84, C85, C86, C87, C88, C89, R106, R107, R109, R104, T2, T4A, C90, R102 and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V17, V18 and V19. Check components associated with the horizontal output and damper stages especially T2 and T4A for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18 and V19. Check associated circuit components.

XMAS TREE EFFECT

Check by substitution V16 and V17. Check C80, C81, C82, C83, R100, R101, L37 and other associated circuit components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V10 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R90, R89, R7 and other associated components.	Check C65, C66, C70, R88, and other circuit components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V10 and V15. Check C2B, R7, R89, T3, T4B and other associated circuit components for failure or change of value.

COMPRESSED AT TOP

Check by substitution V10 and V15. Check C66, C70, R86, and other associated circuit components.

FOLDS

Check by substitution V10 and V15. Check components associated with V10B and V15 for failure or change of value.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check adjustment of AGC delay and fringe lock controls. Substitute V10 and V14. Check components associated with V10A and V14.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V10 and V14. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check components associated with V10B.	Check components associated with V14.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V16 amd V17. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check components associated with V16 and V17.	Check C73 and R79.

HORIZONTAL BENDING

Check by substitution V16, V17 and V18. Check horizontal AFC filter network (R95, R96, C78 and C77) for failure or change of value.

VIDEO

LOSS OF VIDEO

Check C51, R56, R8, picture tube and other associated components.

SOUND BARS (4. 5MC BEAT)

Check fine tuning adjustment. Check adjustments A30 and A29. Check video IF alignment.

POOR CONTRAST

Substitute V9. Check video detector crystal and assembly. Check picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V9 and V10. Check video detector assembly. Check picture tube. Check AGC network for proper operation.

SMEAR

Check by substitution V9. Check video detector crystal and assembly. Check C51, R56, R8, R55, R50, R51, R47, R48, picture tube and other associated components for failure or change of value.

WIDE BLACK BAR ACROSS PIX

Check V4, V5, V6, V7, V8 and V9 for heater to cathode leakage. In case of UHF check V1, V2, and V3.

AUDIO

WEAK OR NO SOUND

Check by substitution V11, V12 and V13. Check components associated with these stages especially R74, R72, C59, T7 and speaker.

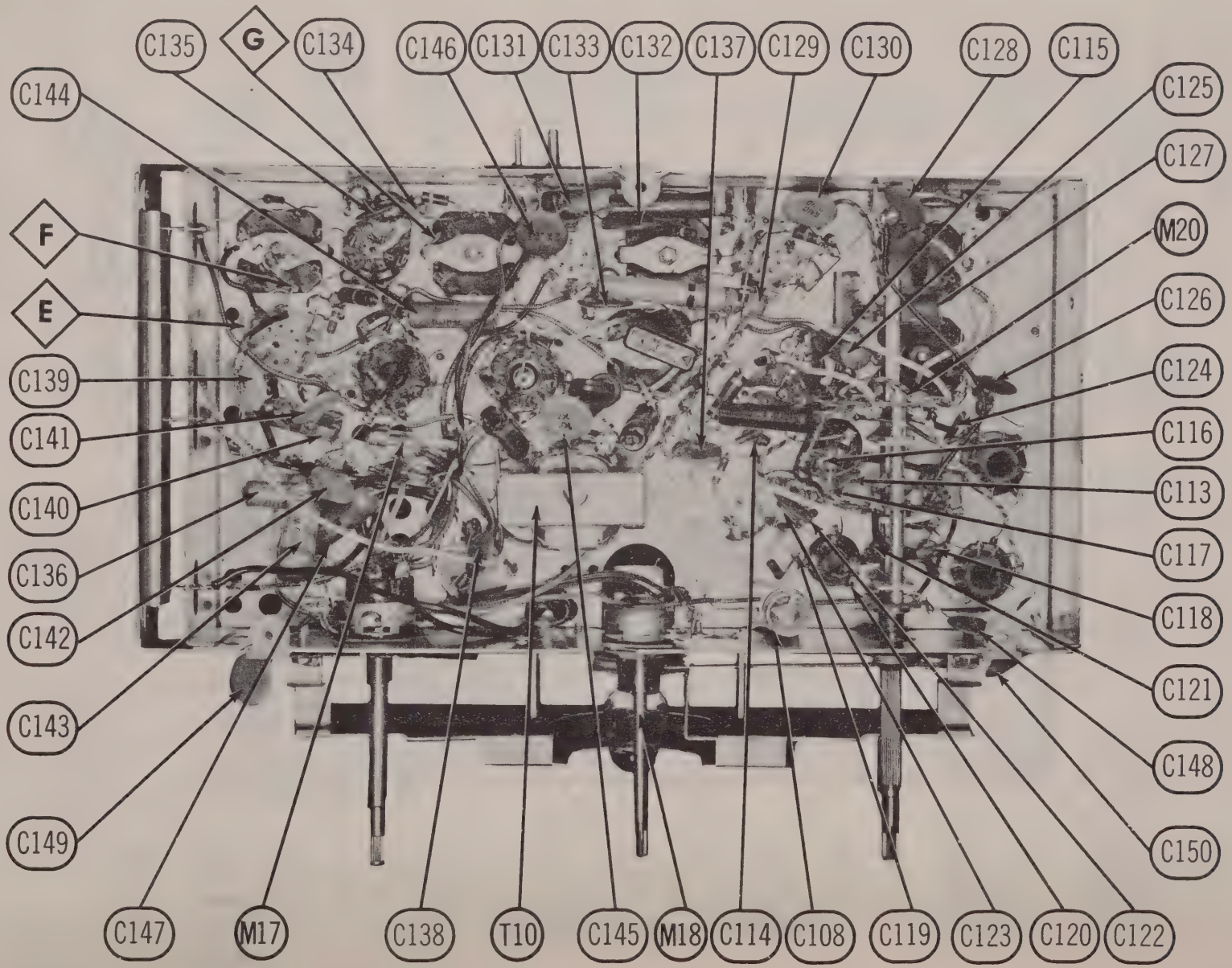
BUZZ

Adjust buzz control for minimum buzz. Check adjustment A32. Substitute V12. Check C56, R67 and other associated circuit components for failure or change of value.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PROPERTY OF
DENVER, COLORADO



AM-FM-CHASSIS BOTTOM VIEW CAPACITOR&ALIGNMENT IDENTIFCATION

TV PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	1st UHF IF Amp.	6BK7A	6BK7A	9AJ	
V3	2nd UHF IF Amp.	6AU6	6AU6	7BK	
V4	RF Amplifier	6BK7A	6BK7A	9AJ	
V5	Converter	6U8	6U8	9AE	
V6	1st Video IF Amp.	6CB6	6CB6	7CM	
V7	2nd Video IF Amp.	6CB6	6CB6	7CM	
V8	3rd Video IF Amp.	6CB6	6CB6	7CM	
V9	Video Output	12BY7	12BY7	9BF	
V10	AGC Keying - Vert. Mult	12AX7	12AX7	9A	
V11	Limiter	6AU6	6AU6	7BK	
V12	Audio Detector	6BN6	6BN6	7DF	
V13	Audio Output	6BK5	6BK5	9BQ	
V14	Sync Separator	6BE6	6BE6	7CH	
V15	Vert. Mult.- Vert. Output	6AH4GT	6AH4GT	8EL	
V16	Horiz. Phase Det.- Horiz. AFC	6AQ7GT	6AQ7GT	8CK	
V17	Horiz. Oscillator - Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V18A	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
B	Horiz. Output	6BQ6G	6BQ6G	6AM	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	

PROPERTY OF
3924
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22A	21YP4	21YP4	21YP4	21YP4	12C	
B	17LP4	17LP4	17LP4	17LP4	12C	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■40	400	22-2437	AFH3-46		BO48		FP378	TVL-4670	
B	▬80	400				BR3045		TC72		
C	▲30	400								
C2A	■40	400	22-2479	E4D641				FP396.2		
B	100	50						TC3501		
C	▬10	475								
D	▲4	350								
C3A	▲100	25	22-2478	E3C466		B007			TVL-3603	
B	■4	350				BR435				
C	40	25								
C4	4		22-2454							
C5	47		22-1667							
C6	400		22-2404							
C7	400		22-2404							
C8	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C9	400		22-2404							
C10	400		22-2404							
C11	27		22-2509							
C12	800		22-2331	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C13	1.2-3.5		22-2405							
C14	400		22-2404							
C15	800		22-2331	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C16	400		22-2503							
C17	800		22-2331	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C18	400		22-2404							
C19	1.8		22-2428							
C20	400		22-2404							
C21	470		22-2302	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C22	400		22-2404							
C23	800		22-2331	BPD-0008	DD-102	TM5T8	801-001	DC-521	5HK-D1	
C24	40		22-2511							
C25	40		22-2511							
C26	40		22-2511							
C27	40		22-2511							
C28	100		22-2403							
C29	100		22-2403							
C30	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C31	470		22-2217	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C32	7		22-2375							
C33	6		22-2381							
C34	9									
C35	24									Note 1
C36	.47	200	22-2145	P288-47		PJ2P5		PT40	2TM-P47	
C37	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C38	330		22-2309	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	
C39	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C40	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C41	470		22-2302	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C42	1000		22-7	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C43	470		22-6	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C44	1000		22-7	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C45	560		22-2310	SI560	D6-561		GP2K-561	UC-5356	5GA-T56	
C46	470		22-2217	SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C47	4.5		22-2383							
C48	7		22-2375							
C49	47		22-2467	SI47	D6-470		GP1K-470	UC-5447	5GA-Q47	
C50	47		22-2325	SI47	D6-470		GP1K-470	UC-5447	5GA-Q47	
C51	.1	200	22-1777	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C52	2000		22-8	BPD-002	DD-202	TM5D2	801-002	DC-522	5HK-D2	
C53	3.3		22-2343	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C54	50		22-2460	S150	D5-500	TM5Q5	GP1K-500	UC-545	5GA-Q5	
C55	1000		22-??	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C56A	10000		22-2278	BPD-2X01	D03-103	TM5D81	821-01	DCD-511	5HK-X81	
B	10000									
C57	10		22-2378							
C58	.047	200	22-1778	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C59	10000		22-3	BPD-01	DD-103	TM5B1	811-01	DC-511	5HK-81	
C60	680		22-2320	B1680	D6-681		GP2K-681	UC-5368	5GA-T68	
C61	4000		22-4	BPD-004	D6-402	TM5D4	GP2-333-403	DC-534	5HK-D4	
C62	.0068	600	22-2288	P688-0068	D6-682	PTE6D68	GP2-333-682	PT6268	6TM-D68	
C63	.0033	600	22-1776	P688-0033	D6-332		GP2-333-332			
C64	.0022	600	22-1845	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C65	.001	600	22-2128							
C66	.001	600	22-2128							
C67	.015	200	22-2452							
C68	.0022	600	22-1814	P688-0022	D6-322	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C69	.022	600	22-2129	P688-022		PTE6S22			6TM-S22	
C70	.1	600	22-1841	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C71	.22	200	22-2167	P488-22		PTE4P22		PT4025	4TM-P22	
C72	.0033	600	22-2246	P688-0033	D6-332		GP2-333-332			
C73	56	500	22-1831							
C74	75	500	22-1256	1489-000075				MCB230		
C75	.001	600	22-2127	P688-001	D6-102	PTE6D1	GP2L-102	PT601	6TM-D1	
C76	.0047	400	22-1842	P688-0047	D6-472	PTE8D47	GP2-333-472	PT8247	8TM-D47	
C77	.15	200	22-2166	P288-15		PJ2P15		PT4015	2TM-P15	
C78	.001	600	22-2127	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C79	.1	200	22-1777	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C80	680	500	22-2125					PT401		
C81	.0015	400	22-1785	P688-0015		PTE6D15			6TM-D15	
C82	1100	500	22-2416							
C83	1000		22-2112	S11000	D6-102	TM6D1	GP2L-102	UC-521	5HK-D1	
C84	680		22-2387							
C85	270		22-2498	S1270	D6-271		GP2K-271	UC-5327	5GA-T27	
C86	.047	400	22-1775	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C87	.15	400	22-2341	P488-15		PTE4P15			4TM-P15	
C88	.1	400	22-2340	P488-1		PTE4P1		PT401	4TM-P1	
C89	.01	400	22-1784	P488-01		PTE4S1		PT411	4TM-S1	
C90	56	1000							20GA-Q56	
C91	10000		22-3	BPD-01	DD-103	TM5B1	811-01	DC-511	5HK-81	
C92	270		22-2477	S1270	D6-271		GP2K-271	UC-5327	5GA-T27	Note 1

Note 1. Not used in all Models.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500Ω	½	63-2836	Q13-133	AG-80-Z	AB-80	U-48	Volume
B	Shaft		Not Req.	C3	ES8-3	AK-4	DM-36	Attach to R1A
C	Switch		Not Req.	76-1	SWS	KB-1	US-25	Attach to R1A
R2A	1Meg	½	63-2835	Q11-137	AG-61-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	ES8-3	AK-4	Not Req.	Attach to R2A
R3A	7.5Meg with 1Meg stop	½	63-2394	Q11-142		AB-89		Bright Note 1.
B	Shaft		Not Req.	RQ		AK-1		Attach to R3A
R4A	200KΩ		63-2837	Q11-139	AG-52-S	AB-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	ES8-3	AK-4	Not Req.	Attach to R4A
R5	4000Ω	½	63-2159	76-1	30-4000			Vert. Range
R6A	2500Ω	½	63-2834	Q11-113	AG-15-S	AB-7	U-8	Vert. Hold
B	Shaft		Not Req.	Not Req.	ES8-3	AK-4	Not Req.	Attach to R6A
R7A	1500Ω	½	63-2815	Q11-112	AG-11-S	AB-6	SU-6	Vert. Linearity Note 2
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R7A
R8A	15KΩ	½	63-2814	Q17-11EX				Contrast tapped at 10KΩ
B	Shaft		Not Req.	WQ				Attach to R8A
R9	4000Ω	½	63-2183					AGC Delay
R10A	800Ω	½	63-2162	Q11-105	AG-5-S	AB-4	U-4	Buzz
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R10A
R11A	7.5Meg	½	63-2805	Q11-143		AB-89	U-43	Fringe lock
B	Shaft		Not Req.	RQ		AK-1	Not Req.	Attach to R11A
R12	200Ω	½	63-2833					Screen regulator Note 3.

Note 1. Connect a 1 Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
Note 2. Some models may use alternate control Part No. 63-2865.
Note 3. Not used in all models.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	IRC PART No.	NOTES
R33	200KΩ	½	63-1833	BTS-220K	
R34	47Ω	½	63-1728	BTS-47	
R35	470Ω	½	63-1772	BTS-470	
R36	220KΩ	½	63-1863	BTS-220K	
R17	68KΩ	½	63-1862	BTS-68K	Note 1
R18	82Ω	½		BTS-82	
R19	82KΩ	½	63-1866	BTS-82K	
R20	470Ω	½	63-1772	BTS-470	
R21	47KΩ	½	63-1855	BTS-47K	
R22	3300Ω	½	63-1932	BTS-3300	
R23	10KΩ	2	63-2145	BTB-10K	
R24	5500Ω	10			
R25	470Ω	½	63-1772	BTS-470	
R26	100KΩ	½	63-2871	BTA-100K	
R27	100KΩ	½	63-1863	BTS-100K	
R28	100KΩ	½	63-1863	BTS-100K	
R29	220Ω	½	63-1758	BTS-220	
R30	68Ω	½	63-1737	BTS-68	
R31	56Ω	½	63-1733	BTS-56	
R32	470Ω	½	63-1772	BTS-470	
R33	2.2Meg	½	63-1826	BTS-2.2Meg	
R34	22KΩ	½	63-1841	BTS-22K	
R35	6800Ω	½	63-1831	BTS-6800	
R36	15Ω	½	63-1708	BTS-15	
R37	10KΩ	½	63-1837	BTS-10K	
R38	120KΩ	½	63-1873	BTS-120K	
R39	120KΩ	½	63-1873	BTS-120K	
R40	470Ω	½	63-1772	BTS-470	
R41	220Ω	½	63-1758	BTS-220	
R42	150Ω	½	63-2694	BTS-150	
R43	220Ω	½	63-1758	BTS-220	
R44	8200Ω	2	63-2698	BTS-8200	
R45	22KΩ	½	63-1841	BTS-22K	
R46	27Ω	½	63-1719	BTS-27	
R47	10KΩ	½	63-2145	BTB-10K	
R48	100KΩ	½	63-1982	BTS-100K	
R49	22KΩ	½	63-1841	BTS-22K	
R50	3300Ω	4	63-2699		
R51	3300Ω	4	63-2699		
R52	10KΩ	½	63-1838	BTS-10K	
R53	100KΩ	½	63-1863	BTS-100K	
R54	2700Ω	½	63-1830	BTS-2700	
R55	1000Ω	½	63-1786	BTS-1000	
R56	220KΩ	½	63-1883	BTS-220K	
R57	220KΩ	½	63-1883	BTS-220K	
R58	100KΩ	½	63-1870	BTS-100K	
R59	2700Ω	½	63-1830	BTS-2700	
R60	4700Ω	½	63-1813	BTS-4700	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	IRC PART No.	NOTES
R61	470KΩ	½	63-1897	BTS-470K	
R62	680KΩ	½	63-2290	BTS-680K	
R63	100KΩ	2	63-2170	BTB-100K	
R64	330Ω	1	63-1890	BTA-330	
R65	100KΩ	½	63-1870	BTS-100K	
R66	100KΩ	½	63-1781	BTA-100K	
R67	33KΩ	2	63-2180	BTB-33K	
R68	220KΩ	½	63-1883	BTS-220K	
R69	680Ω	½	63-1904	BTS-680	
R70	330KΩ	½	63-1890	BTS-330K	
R71	1000Ω	½	63-1786	BTS-1000	
R72	180Ω	½	63-1754	BTS-180	
R73	10KΩ	½	63-1838	BTS-10K	Note 3
R74	470Ω	1	63-2398	BTA-470	
R75	680KΩ	½	63-2290	BTS-680K	
R76	1.5Meg	½	63-1918	BTS-1.5Meg	
R77	47KΩ	2	63-1157	BTB-47K	
R78	680KΩ	½	63-2286	BTS-680K	
R79	100KΩ	½	63-1982	BTS-100K	
R80	33KΩ	½	63-1849	BTS-33K	
R81	4.7Meg	½	63-1933	BTS-4.7Meg	
R82	180KΩ	½	63-1880	BTS-180K	
R83	470KΩ	½	63-1897	BTS-470K	
R84	47KΩ	½	63-1855	BTS-47K	
R85	100KΩ	½	63-1870	BTS-100K	
R86	22KΩ	½		BTS-22K	Note 4
R87	100Ω	½	63-1744	BTS-100	
R88	1.8Meg	½	63-1922	BTS-1.8Meg	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	IRC PART No.	NOTES
R89	8200Ω 5%	1	63-2273	BTA-820 5%	
R90	680Ω	1	63-2290	BTA-680	
R91	560Ω	1	63-1775	BTS-560	
R92	560Ω	½	63-1775	BTS-560	
R93	1Meg	½	63-1913	BTS-1Meg	
R94	1Meg	½	63-1913	BTS-1Meg	
R95	1Meg	½	63-1913	BTS-1Meg	
R96	27KΩ	½	63-1162	BTS-27K	Note 5
R97	100Ω	½	63-1744	BTS-100	
R98	470Ω	½	63-1772	BTS-470	
R99	10KΩ	3	63-2176	BTH-10K	
R100	47KΩ	1	63-1194	BTA-47K	
R101	22KΩ	½	63-958	BTS-22K	
R102	47KΩ	½	63-1856	BTS-47K	
R103	3900Ω	½	63-1810	BTS-3900	
R104	470KΩ	½	63-1897	BTS-470K	
R105	100Ω	½	63-1744	BTS-100	
R106	18KΩ	2	63-2364	BTB-18K	
R107	18KΩ	2	63-2364	BTB-18K	
R108	22KΩ	1	63-958	BTA-22K	
R109	3300Ω	2	63-1970	BTB-3300	
R110	1.2Ω	½	63-2129		
R111	33KΩ	½	63-1848	BTS-33K	
R112	100KΩ	½	63-1863	BTS-100K	
R113	8.2Ω	2	63-3898		
R114	150KΩ	½		BTS-150K	
R115	22Ω	½		BTS-22	

Note 1. Some models may use a 330Ω resistor in this application.
Note 2. Some models may use a 3900Ω resistor in this application.
Note 3. Used in radio & TV combinations only.
Note 4. Some models may use a 15KΩ resistor in this application.
Note 5. Some models may use a 47KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC @1.72A	560VCT @.270ADC	5VAC @3A	12.6VCT @4.8A	95-1298					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	470Ωtap @40.5Ω, 58Ω, 13Ω, 24Ω	1.6Ω SEC. 2 0Ω	S-18567 S-18566①				DA-36 ⑩		Horiz. Output Trans.
T3	480Ωtap @3Ω, 37Ω		95-1261	A-8113②					Vert. Output Trans.
T4A	18Ω		95-1257	DY-9A④ ⑪	MDF72④	DF602④	Y-17④	209D1④⑪	Horiz. Deflection Coils
B	52Ω		S-18998 ③						Vert. Deflection Coils
T5	14Ω		S-18570	WC-3⑦ ⑧	MWC-2		WC-11⑧	20IR5 ⑦ ⑧	Horiz. Linearity Coil Width Coil
T6	20.5Ω	4.7Ω	S-18748						

① Winding only for horizontal output trans.
② Connect blue lead to plate and red lead to point of original B+. Tie green lead of transformer to white lead of yoke and connect to chassis ground. Tie white lead of transformer to red lead of yoke and connect to vertical blanking circuit.
③ Yoke cover and positioning device.
④ Use original yoke cover and positioning device.
⑤ Use original horizontal deflection coil network, if necessary.
⑥ Use original deflection coil network.
⑦ Do not use tap.
⑧ Drill new mounting hole.
⑨ Connect to coded orange and black terminals.
⑩ Exact replacement for transformer winding only. See instruction sheet packed with unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	Halldorson PART No.	TRIAD PART No.	NOTES
T7	6.8KΩ	3.3Ω	525Ω	.64Ω	95-1339	A-3877①	A-3020	Z1002	S-5Z	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	ZENITH PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1A	8"	PM	3.3Ω	49-745 ①	879	8A21	① Used in Models L2281, L2281R & L2281E
B	10"	PM	3.3Ω	49-738 ②	10J11	10A31	② 10" PM used in Models L1846R, L1846E, L2256R, L2256E, L2262R & L2262C
				49-549 ②			
				49-728 ③			③ 10" PM used in Model L2285R
C	5 1/4"	PM	3.3Ω	45-506 ④	525J4	52A1	④ Used in Models L2336R & L2336E

COILS (RF-IF)

ITEM No.	USE	DC RES.		ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
		PRI.	SEC.					
L1	UHF Ant. Coil Pri.	0Ω CT		S-19583				
L2	UHF Ant. Coil Sec.	0Ω		20-426				
L3	UHF Mixer Coil	0Ω		20-426				
L4	Fil. Choke	.1Ω		20-425				
L5	Fil. Choke	0Ω						
L6	Fil. Choke	0Ω						
L7	Cathode Choke	0Ω		20-423				
L8	RF Choke	.1Ω		20-425				
L9	RF Choke	.1Ω		20-425				
L10	UHF Osc. Coil	0Ω		20-426				
L11	UHF Osc. Coupling Coil	0Ω		20-468				
L12	UHF IF							
	Coupling	.8Ω		S-20555				
L13	Feedback Coil	2.3Ω		S-19541				
L14	RF Choke	.4Ω		S-20607				Wound on resistor
L15	RF Choke	.4Ω		S-20610				Wound on resistor
L16	UHF IF Output Coil	.2Ω CT		S-20608				
L17	IF Trap	0Ω		S-20503				
L18	IF Trap	0Ω		S-20503				
L19	Fil. Choke	0Ω		20-391				
L20	39.75MC Trap	0Ω		S-20390				Includes core, core part #149-111
L21	47.25MC Trap	0Ω		S-18210				Includes core, core part #149-111
L22	41.25MC Trap	0Ω		S-19968				Includes core, core part #149-111
L23	1st. Video IF	.1Ω		S-19736			6234	Includes core, core part #149-111, coil shield & lug, part #6-16982
L24	2nd. Video IF	.1Ω	.1Ω	S-17907			6233 *	Includes core, core part #149-110, coil shield & lug part #6-17916
L25	3rd. Video IF	.1Ω	.1Ω	S-19953			6233 *	Includes core, core part #149-110, coil shield & lug part #6-17916
L26	Fil. Choke	.1Ω		S-18984			6613	9.6 Microhenries
L27	4th. Video IF	.3Ω	.3Ω	S-19955				Part of Video Det. Assy. part #3-19956 complete - Includes L27, L28, L29, L30, crystal detector (part #1G3-J), C66 & C68
L28	Series Peaking Coil	8.5Ω		S-19954	19-3180		6644	144 Microhenries
L29	Shunt Peaking Coil	8.5Ω		S-19953	19-3180 †	TV-184 †	6644 †	180 Microhenries, wound on 2700Ω resistor in series
L30	Series Peaking Coil	1.5Ω		S-15128			6612	12 Microhenries Not used in all Models
L31	RF Choke			S-19969				
L32	Series Peaking Coil	8Ω		S-20021	19-4200	TV-184 a	6154 a	220 Microhenries, wound on 15KΩ resistor
L33	Shunt Peaking Coil	13Ω		S-17958	19-3500	TV-186	6174	481 Microhenries
L34	1st. Sound IF	1.9Ω	2.1Ω	S-19959				
L35	2nd. Sound IF	.3Ω	.3Ω	S-20219	18-3445			Includes core, core part #149-96, coil shield & lug part #6-19734
L36	Quadrature Coil	4.4Ω		S-19901	20-1005			Includes core, core part #149-110
L37	Horiz. Osc.	150Ω (tap @ 60Ω)		S-19743	19-3577			Includes core, core part #149-131
L38	Anti-Ringing Coil	5Ω		S-20367	19-3180 ■	TV-184 ■	6180 ■	183 Microhenries, wound on 330Ω resistor

* Detune trap
† Add 2700Ω resistor in series
a Parallel with 15KΩ resistor
■ Parallel with 330Ω resistor

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C RESISTANCE	RATINGS INDUCTANCE (0 CURRENT (1000 ~)	ZENITH PART No	STANCOR PART No	MERIT PART No	Halldorson PART No.	TRIAD PART No
L39	270A	85Ω	2.6HY	95-1346		C-2991 ①	C5037	

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	ZENITH PART No FUSE	ZENITH PART No HOLDER	LITTELFUSE PART No FUSE	LITTELFUSE PART No HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
M1	3AG	2/10A 250V		53-1883	312.200 (3AG-2/10A)	357001	AGC 2/10	4405

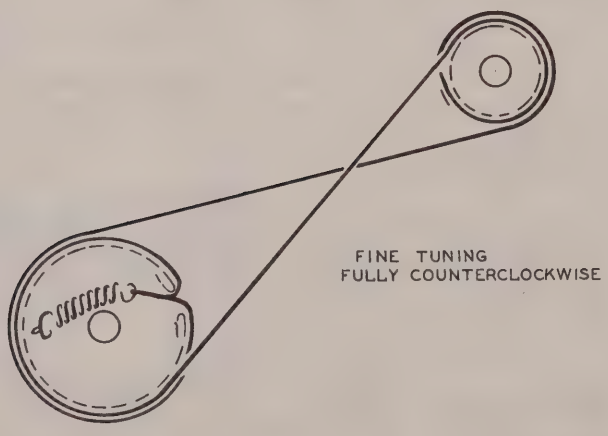
TV PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	SYLVANIA PART No.		
M2 M3	1N64 CK710	103-1	1N132 1N82 or 1N82A		Video detector UHF mixer

MISCELLANEOUS

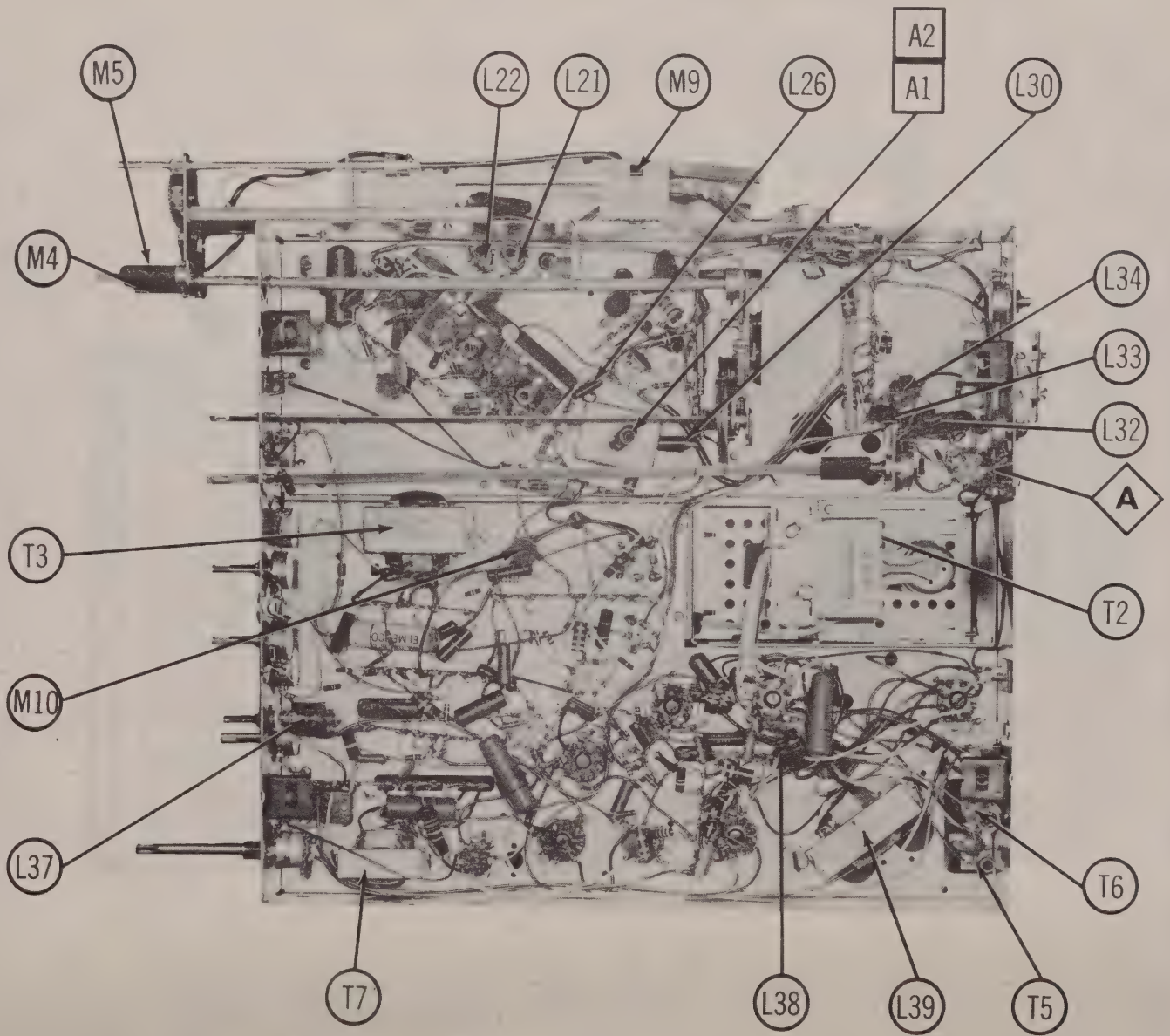
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M4	Dial Light	100-166	#47 Bayonet /UHF indicator - UHF Models only
M5	Dial Light	100-166	#47 Bayonet/ VHF indicator - connected to terminal point at front of chassis on VHF Models.
M6	Tuner	S19670	UHF
M7	Tuner	S199170	VHF turret
M8	Trap	S20602	IF filter for police & amateur interference
M9	Switch		UHF-VHF selector (2) DPST slide
M10	Integrator	87-1	Vertical sync
M11	Centering Magnet	S20344	
M12	Ion Trap	S17461	
M13	Correction Magnet	S20360	(2) used
B1	Trimmer Cap.	22-2398	Horiz.Drive Adj.
	Cabinet	14-1571E	Model L1846E & EU
	Cabinet	14-1571R	Model L1846R & RU
	Cabinet	14-1590E	Model L2236E & EU
	Cabinet	14-1590R	Model L2236R & RU
	Cabinet	14-1575E	Model L2258E & EU
	Cabinet	14-1575R	Model L2258R & RU
	Cabinet	14-1574E	Model L2262C & CU
	Cabinet	14-1574R	Model L2262R & RU
	Cabinet	14-1616	Model L2281 & L2281U
	Cabinet	14-1616E	Model L2281E & EU
	Cabinet	14-1616R	Model L2281R & RU
	Cabinet	14-1516R	Model L2285R & RU
	Knob	S-20277	Channel Selector, Models 1846R & RU, 2236R & RU, 2262R & RU, 2281 & 81U, 2281R & RU, 2285R & RU, 2258R, RU
	Knob	S-20328	Channel Selector, Models 1846E & EU, 2236E & EU, 2262C & CU, 2281E & EU, 2258E , EU
	Knob	46-1051	Fine tuning Models 1846E, EU, R, RU
	Knob	46-1052	Fine tuning Models 2236E, EU, R, RU, 2262C, CU, R, RU, 2281, 81U, E, EU, R, RU, 2285R, RU, 2258E, EU, R, RU
	Knob	46-1117	Horiz.Hold Models 1846E, EU, R, RU
	Knob	46-1118	Horiz.Hold Models 2236E, EU, R, RU, 2262C, CU, R, RU, 2281, 81U, E, EU, R, RU, 2285R, R U, 2258E, EU, R, RU
	Knob	46-1181	Vert.Hold & brightness Models 1846E, EU, R, RU
	Knob	46-1182	Vert. Hold & brightness Models 2236E, EU, R, RU, 2262C, CU, R, RU, 2281, 81U, E, EU, R, RU, 2285R, RU, 2258E, EU, R, RU
	Knob	46-1182	Screen & tone All Models
	Knob	46-1196	Volume Models 1846R, RU, 2236R, RU, 2262R, RU, 2281, 81U, 2281R, RU, 2285R, RU, 2258R,RU
	Knob	46-1197	Volume Models 1846E, EU, 2236E, EU, 2262E, EU, 2281E, EU, 2258E, EU
	Knob	46-1198	Contrast Models 1846E, EU, R, RU
	Knob	46-1199	Contrast Models 2236E, EU, R, RU, 2262C, CU, R, RU, 2281, 81U, E, EU, R, RU, 2285R, RU, 2258E, EU, R, RU
	Safety Glass	12-1925	2262 Series
	Safety Glass	192-153	1846 Series
	Safety Glass	192-154	Series 2236, 2258, 2281, 2285



FINE TUNING DRIVE CORD STRINGING

PROPERTY OF
L. F. CUSHMENS
2974 MIAMI ST.
DENVER, COLORADO

A M – F M CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



TV CHASSIS-BOTTOM -TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLACKENSHIP
2024 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V21. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PIX

Substitute V21. Check B+ filter and decoupling components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V17, V18, V19 and V20. Check waveform W17.

If Satisfactory	If Unsatisfactory
Check R110, C86, R106, R107, T2, T4A and other associated com ponents.	Check C83, C84, C85, R104, R102, R114 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18, V19, V20 and V21. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V17, V18, V19, V20 and V21. Check R110, C86, R106, R107, T2, T4A, picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss of Video".

RASTER NO SOUND NO PIX (VHF)

Check UHF, VHF switch position. Check by substitution V4, V5, V6, V7, V8 and V9. Check associated components.

RASTER NO SOUND NO PIX (UHF)

Check UHF, VHF switch. Check V1, V2 and V3. Check M3.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

DISASSEMBLY INSTRUCTIONS

RADIO

1. Disconnect loop antenna, phono plug, AC line plug and speaker.
2. Remove 2 chassis nuts. Remove radio chassis.

TV

1. Remove 5 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna, AC line plug and speaker.
4. Remove 4 speaker nuts. Remove speaker.
5. Remove 4 chassis bolts. Remove TV chassis.

NOTE: It is necessary to remove radio chassis before removing TV chassis.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF tuner oscillator circuit. Remove rear cover supply power to set. Adjustments are made through the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel (Fine tuning control must be set to its center of its range before making adjustments).

Use alignment wrench 68-21 for adjustments.

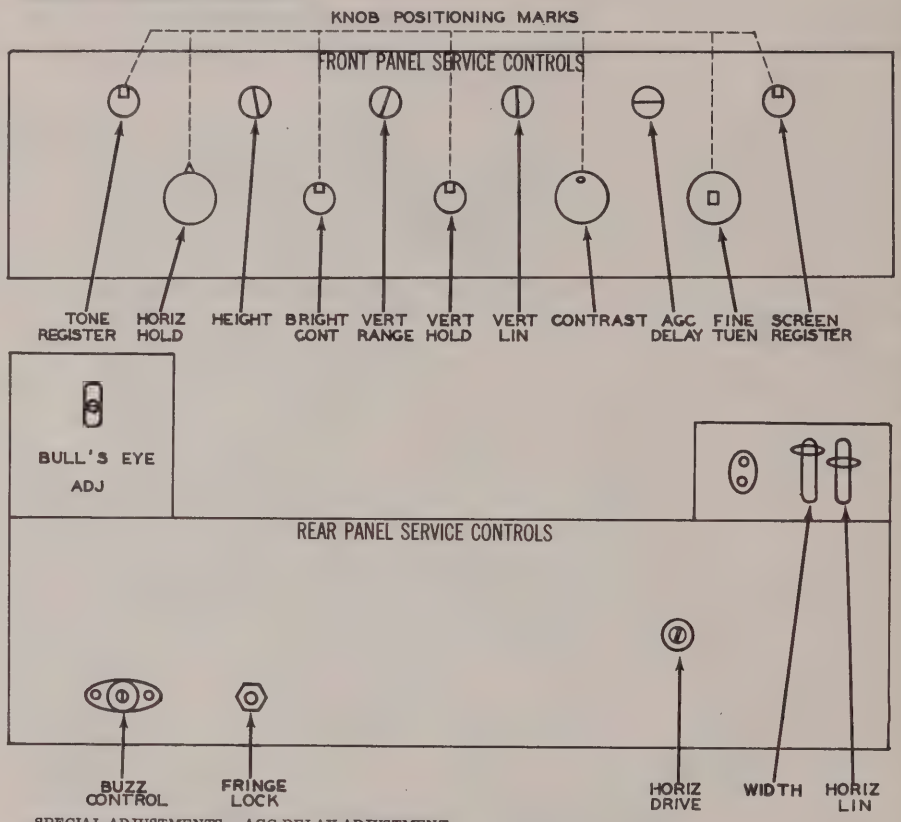
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC DELAY ADJUSTMENT

Turn the set on and tune in a TV signal and observe the picture. Starting from the full clockwise position turn the AGC delay control slowly counter clockwise until picture distorts and buzz is heard in the sound. Then turn control clockwise for clearest picture and best sound.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again.

Slightly retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control. Adjust the horizontal hold control (L37) until picture synchronizes horizontally. If results cannot be obtained see horizontal sweep circuit adjustments on page 11

SOUND IF DETECTOR BUZZ ADJUSTMENT

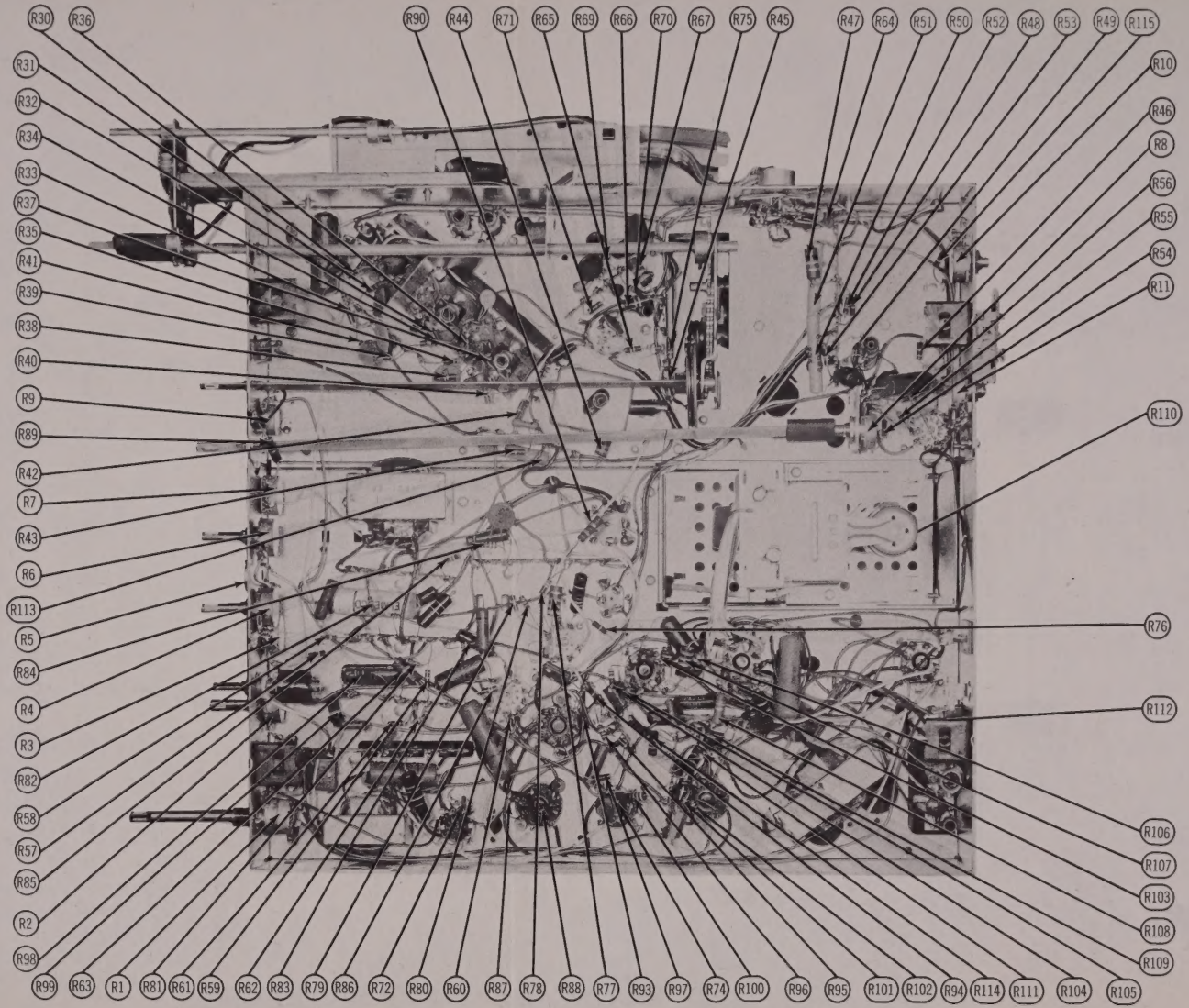
Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6, 7 .

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for radio power supply protection used on combination receivers which has the Model 8L20 AM-FM radio chassis only. (For location, see tube placement chart).

ANTI-PIN CUSHION ADJUSTMENT

Adjust the vertical height and horizontal width controls so that the corners and sides of the picture are visible. Bend the corrector magnets arms for right angle corners and until opposite sides of the picture are parallel and straight. Restore picture to normal size.



PROPERTY OF
L. F. BLANKENSH
3924 MEADE ST.
DENVER, COLORADO

TV CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION